# Request For Inspection

Only For RFI
15 MAR 2025
PK17 OF CBD PROJECT

**Date:** 15-Mar-2025

**Request no.** RFI-CSCEC-17-E01-ME-01-1866-00

**Project No. & Title:** E18066-0200S - The Central Business District of the New Administrative Capital

| Employer: | Engineer: | Sub Consultant: | Contractor: |
|---|---|---|---|
| Arab Republic of Egypt<br>Ministry of Housing, Utilities and Urban Communities<br>New Urban Communities Authority | dar | SHAKER | 中国建筑股份有限公司 |

temporary Initial Operation Functional test inspection only for FM200 standalone system without complete final interface with MFAP and HVAC system

Intial Function test for FM200 system E01-first floor-MDB room (133)

We request your attendance to inspect the following works :

1. **Type** :Buildings ☐ Electrical ☑ Mechanical installations

2. **Inspection Time** : 10: 00 AM **Date** : 16/03/2025

3. **Location**:

4. **Inspection** :

Dar Mech:Mohamed Abdelaziz/Tamer.ElBeltagy (19-03-2025)-Code C
1- Final Test should be done after the inspection approval of the Cause and effect Matrix
2- installation of all smoke motorize Fire Dampers related to all related "AHUs & FANs" should be approved
3- All comments should be finalized before the Final Function Test

RECEIVED
15 MAR 2025
SCG
C.U.C

5. **Purpose of Inspection** :

1. Electrical
- ☐ Setting out
- ☐ Furniture elect. culvert
- ☐ MV cables
- ☐ Street lighting cables
- ☐ Street lighting poles
- ☐ Telephone duct Bank
- ☐ TV cables

Dar Mech:Mohamed Abdelaziz/Tamer.ElBeltagy (19-03-2025)-Code C
1- all dedicated HVAC equipment (AHU,FCU,Split Unit, Fans,..etc)for the spaces which protected by FM-200 should be closed by FM-200 panel in the same time of closing the related motorize Fire/ Smoke Dampers
2- all non dedicated HVAC equipment (common HVAC equipment for multiple spaces) and there is a space protected by FM-200 and has dedicated motorize Fire/ Smoke damper (not common with other space )to be closed by the Fire Alarm Panel
3- Fire protection senarios for all spaces protected by FM-200 to be provided (for each space)
4-The test is failed and all related equipment installation should be completed and approved and to be interfaced with the dedicated fire control panel
5-HVAC units should be interfaced with dedicated fire control panel, so that in case of fire it will shut off the HVAC units

SCG : SCG FF :MECH-FF: Khaled Awad-016-03-2025- Code C

1-This RFI may accepted as temporary Initial Operation Functional test inspection only for FM200 standalone system without complete final interface with MFAP and HVAC system and to be repeated again due to the reasons mentioned on attached A4 sheet of comments & All comments should be done before next stage of final Functional test.
2- interface with Main fire alarm panel & BMS not yet done.
3-All comments of installation RFI shall be released before next stage of final Functional test.
4-Fire protection scenarios for Space protected by FM200 System be provided (in case of fire ) as per last revision of approved Cause and effect matrix TOD-CSCEC-17-CUC-EL-LC-0096
5-Contractor is responsible to Follow all ACUD requirement and all requirement of (EETC) Egyptian Electricity Transmission Company (Handover records).
6--Contractor is responsible for any activation for the solenoid valves of FM200 Cylinders and handing-over the system to the End user/ operator.
7-Provide protection method for cylinders/ Solenoid valves /manual release and protect them from tampering and misuse.
8-The Contractor is responsible to comply with all local Civil defense comments /requirement without any extra cost.

SCG: MECH-FF: Khaled-\Code C
Awad-16-03-2025

SCG-HVAC Comments-Code C
- Refer to the attached comments
SCG Mohammad Taha 17/03/2025

**Signature**

Dar/SCG LC -Code C
1-Please Stick and provide response to the attached Reply A4 sheet LC of comments

DAR Eng. Yasser Adel 19-.03-2025
SCG Eng. Tamer Eissa 17-03-2025

Date/time of inspection : 16-03-2025

**7. Engineer's Representative Comments:**

Dar Mech:Mohamed Abdelaziz/
Tamer.ElBeltagy (19-03-2025)-CodeB

The works are : ☐ Approved ☑ Approved as Noted ☐ Rejected

Signature _____ Date : _____

Attach all relevant particular test forms
Approval shall not relieve Contractor of his liabilities under the Contract or constitute authorization of any change to Contract Documents



dar

**SCG Comments on RFI-CSCEC-17-E01-ME-01-1866-00- Temporary Initial Operation Functional test inspection for Fire fighting FM200 (E01– GR –Room# MDB-133**

## SCG-HVAC Comments

- Repair the installation of MFSD/AD and follow the approved manufacturer recommendations
- Repair the riser's penetrations/Follow the approved details
- Apply duct cleaning /Follow the approved MST
- AHU & Fans Testing, commissioning & balancing not done
- Install the missing identifications & Tags
- Submit C&E matrix for approval considering (AHU, Fans & MFSD) action during fire scenario
- Rectify the mis-coordination while many obstructions of cable tray with the installed grills
- TAB & CSCEC shall be review the AHU & Fans air flow against the grill's quantities & the specified flow
- Repair the duct insulation on the main duct & duct branches
- Repair the duct flexible connection on the construction joints
- Repair the duct supports & install the missing ones
- Complete the missing VD/OBD on each branch/Grill and follow TAB recommendations
- Rectify the mis-coordination while S/R duct obstructed smoke duct WMS/Follow the approved proposal

**SCG Mohammad Taha 17/03/2025**

**SCG-Mechanical Fire Fighting Comments:**

- **SCG : FF: This RFI may accepted as temporary Initial Operation Functional test inspection only for FM200 standalone system without complete final interface with MFAP and HVAC system and to be repeated again due the following reasons:**

1- All below comments should be done before next stage of final Functional test
2- All comments of installation RFI shall be released before next stage of final Functional test.
3- Fire protection scenarios for Space protected by FM200 System be provided (in case of fire ) as per last revision of approved Cause and effect matrix TOD-CSCEC-17-CUC-EL-LC-0096
4- FM200 permanent Functional test operation is not ready as per attached report from Third party (TAB) (TAB Comments)
5- CSCEC to provide sheet of response proving that all TAB third part comments mentioned on attached TAB report have been released in Final function Test.
6- Work is not ready to complete Final Functional test inspection as per attached report from Third party (TAB) (TAB Comments as following):

**TAB Comments:**

**A. "MDB Room" FM 200 System**

**☐ All pipe marking, identification and tags are not installed.**

**☐ All AHUs (AHU-07, AHU-08, AHU-10) serving the protected area is working but not yet commissioned by TAB.**

**☐ All FANs (MK. Fan-01, MK. Fan-02, SM. Fan-01, SM. Fan-02) serving the protected area was not yet commissioned by TAB.**

**☐ However, All AHUs are not commissioned yet, the interface of MFSD closing with the first knock and AHUs to shut down was commissioned and working properly, (AHU-08,07 Supply and return MFSDs close from a direct signal from FM200 panel while AHU-10 Supply and return MFSDs close from a signal coming from FACP as the are located on the roof far away and outside the room.**

**☐ All Smoke FANs (SM. Fan-01, SM. Fan-02) serving the protected area was not powered during the test so MFSD was not checked for opening after 610s from the second knock, (the minimum time to conserve the integrity of the room). But count down was shown on the FM200 panel.**

**☐ The Annunciator panel is not installed.**

**☐ warning/instruction notices are not provided at the entrance and inside the protected area are missing.**

**☐ Wiring labels are not installed inside & around the panel.**

**☐ Spacing under the doors and holes of the walls must be closed to conserve room integrity.**

**☐ Modules of solenoid monitor no.1,2,4 and low-pressure no.4 needs to be replaced as there are troubles shown on the FM200 panel indicating false signals from the devices.**

**☐ FAS is working but not commissioned yet, however the interface between FAS & FM200 was tested and all AHUs MCC was shut down after the 1st Knock, also the FAS alarm worked during the test on the 1st knock**

☐ **BMS is not ready yet.**

7- As mentioned in TAB report SMD opening time, Clarify the reference and bases after confirmation from FM200 supplier and HVAC supplier and Fire alarm supplier the selection of interface of SMD opening after 610Sec?
8- For FM200 interface: Clarify the reference and bases after confirmation from FM200 supplier and HVAC supplier and Fire alarm supplier the selection of SMD opening delay time after gas release in order to work Makeup fans &Smoke exhaust fans for smoke evacuation in this rooms .
9- For FM200 interface: Clarify with official approved document the scenario and whom responsible to close AHUs, FCUs in first alarm of FM200 Control panel and open Makeup fans &smoke exhaust fans after gas release if this equipment's are dedicated to electrical rooms have FM200 fire suppression system (MAIN FIR ALARM PANEL) OR FM200 PANEL, refer to NFPA 2001 requirement.
10- Provide missing Key maintenance switch.
11- Battery autonomy test alarm test with battery full loaded 15 min not yet done.
12- Missing annunciator panel not yet installed.
13- Provide missing Door Draft stopper at the bottom of door to avoid any infiltration of FM200 Gas in case of fire, otherwise will be snag list, and Function Test RFI will be rejected.
14- Stick to SI-17-CUC-ME-0218 CUC- E01 – Corrosion and rust in FM200 gas cylinder bases.
15- All MEP systems related to the interference with the FM200 system should be installed, inspected, tested and checked by the engineer assigned to them such as not limited to HVAC equipment/Motorized dampers, Main Fire Alarm, BMS, Motorized Fire curtains, access doors…etc (Provide copy from approved RFI covers is mandatory with RFI of functional test)
16- Interface with Main fire alarm panel &&HVAC& BMS not yet done (Provide copy from approved RFI covers is mandatory with RFI of functional test)
17- pipe identification and final paint not yet inspection
18- Wiring Label and tagging not finished yet, they shall be completed and inspected.
19- Cleaning all FF pipes/ cylinders/Panel and supports from scratch, Arch Finishing paint,otherwise will be snag list
**20- Contractor is responsible to Follow all ACUD requirement and all requirement of (EETC) Egyptian Electricity Transmission Company (Handover records).**
21- Contractor is responsible for any activation for the solenoid valves of FM200 Cylinders and handing-over the system to the End user/operator.
22- Provide protection method for cylinders/ Solenoid valves /manual release and protect them from tampering and misuse.
23- The Contractor is responsible to comply with all local Civil defense comments /requirement without any extra cost.

**RFI-CSCEC-17-E01-ME-01-1866-00**

## Temporary Initial Operation Functional test inspection

## For FM200 (E01– 01–Room# MDB-133

## Low current Comments:-Code C- Revise and resubmit

1. **The functionality testing of the FM-200 system does not currently interface with the mechanical and fire alarm systems.**
2. **Final approval is contingent upon the testing and commissioning of the full system operation.**
3. **All fire alarm system interfaces related to the FM-200 system must be fully completed before conducting functional tests.**
4. **All unused openings in the box must be sealed.**
5. **The wires inside the FM-200 control panel must be properly numbered, labeled, and tagged, including those inside the cable trunk. This task has not been completed yet.**
6. **All wires inside the panel must be connected according to the manufacturer's guidelines and standard installation practices.**
7. **"The test has failed, and all related equipment installations must be completed, approved, and properly integrated with the dedicated fire control panel."**
8. **"Fire protection scenarios for all spaces protected by FM-200 must be provided for each individual space."**
9. **"The interface with the main fire alarm panel and BMS has not been completed yet."**
10. **"The contractor is responsible for complying with all local Civil Defense comments and requirements at no additional cost."**
11. **When reviewing the mechanical notes approved in the Request for Information (RFI), they must be considered in conjunction with the electrical notes.**
12. **The battery autonomy test, with the battery fully loaded for 15 minutes, has not been conducted yet.**
13. **The annunciator panel is missing and has not been installed.**

# The Central Business District
# New Administrative Capital

# CUC

# TAB Report

## For

## FM200
## Initial Functional Test
## MDB Room - 133

| System | FM 200 | Date | 12/3/2025 |
|---|---|---|---|
| Building | CUC | Location | MDB Room 1-133 |

## TAB Comments:

### A. "MDB Room" FM 200 System

- All pipe marking, identification and tags are not installed.
- All AHUs (AHU-07, AHU-08, AHU-10) serving the protected area is working but not yet commissioned by TAB.
- All FANs (MK. Fan-01, MK. Fan-02, SM. Fan-01, SM. Fan-02) serving the protected area was not yet commissioned by TAB.
- However, All AHUs are not commissioned yet, the interface of MFSD closing with the first knock and AHUs to shut down was commissioned and working properly, (AHU-08,07 Supply and return MFSDs close from a direct signal from FM200 panel while AHU-10 Supply and return MFSDs close from a signal coming from FACP as the are located on the roof far away and outside the room.
- All Smoke FANs (SM. Fan-01, SM. Fan-02) serving the protected area was not powered during the test so MFSD was not checked for opening after 610s from the second knock, (the minimum time to conserve the integrity of the room). But count down was shown on the FM200 panel.
- The Annunciator panel is not installed.
- warning/instruction notices are not provided at the entrance and inside the protected area are missing.
- Wiring labels are not installed inside & around the panel.
- Spacing under the doors and holes of the walls must be closed to conserve room integrity.
- Modules of solenoid monitor no.1,2,4 and low-pressure no.4 needs to be replaced as there are troubles shown on the FM200 panel indicating false signals from the devices.
- FAS is working but not commissioned yet, however the interface between FAS & FM200 was tested and all AHUs MCC was shut down after the 1st Knock, also the FAS alarm worked during the test on the 1st knock
- BMS is not ready yet.

## Conclusion:

1. Fm200 system functional tests are working properly.
2. Fm200 system is commissioned on temporary operation and accepted by TAB with consideration to the above-mentioned comments.

# ATTACHMENT (1)

*Pre- Commissioning Check Sheet*

# PRE- COMMISSIONING CHECK SHEET
## For Clean Agent System FM200

| Pre-Commissioning Checks | | OK | NOK |
|---|---|---|---|
| **A.** | **General Checks** | | |
| 1. | Check the pressure test is conducted for the piping and it is approved by consultant. | √ | |
| 2. | Check the room integrity test report is passed and it's approved by consultant which done and coordinated by specialist. | √ | |
| 3. | Check that the gas cylinders rooms are clear of debris. | √ | |
| 4. | Ensure that the installation is completed and approved by consultant. | √ | |
| 5. | Check and ensure that FM 200 cylinders are located and securely fastened in accordance with manufacturer's requirements. | √ | |
| 6. | Ensure that all the system components are in place (alarm, strobe, detectors, piping, manual release, etc.) | √ | |
| 7. | Check if warning/instruction notices provided at entrance to the protected area. | | (1) |
| 8. | Check warning/instruction notices provided inside the protected area which is normally occupied. | | (1) |
| 9. | Check if the permanent nameplate with adequate information provided to gas cylinder. | √ | |
| 10. | Ensure that the smoke detector tester available at the site to start inspection. | √ | |
| 11. | Check the cylinder barricaded to avoid the unwanted access by others. | √ | |
| 12. | Ensure that the building fire alarm and BMS is ready for interface testing. | | (2) |
| **B.** | **Electrical Checks** | | |
| 1. | Installation is completed and RFI is approved by the consultant. | √ | |
| 2. | Check if the electrical primary A.C. supply and secondary battery D.C. supply provides adequate capacity for both the detection and operating devices. | √ | |
| 3. | Check whether the electrical circuits and earthing have been terminated and labelled properly as per approved shop drawings a as per manufacturer recommendations. | | (3) |
| 4. | Check the accessibility of the manual control. | √ | |
| 5. | Check labelling and conduit glands are secured. | √ (3) | |

***Signatures:***

| | | | | | |
|---|---|---|---|---|---|
| DAR/SCG Rep. | TCM | | TAB Rep. | TCM | Abdulla Osama |
| CSCEC Rep. | TCM | | Supplier Rep. | TCM | |

| C. | Mechanical Checks | | |
|---|---|---|---|
| 1. | Check all the mechanical piping connection completed and cylinder installation at the proper location. | √ | |
| 2. | Check whether all pipe marking, identification and tags. | | √ |
| 3. | Check that FM 200 gas cylinder pressure gauges showing the acceptable pressure range. | √ | |
| 4. | Check and ensure that the correct types of FM 200 discharge nozzles and pipes are installed as per approved shop drawings. | √ | |
| 5. | Check the pressure indicator in gas cylinder. | √ | |
| 6. | Check discharge pipe tightly connected to the cylinder's outlet and without any damage. | √ | |
| 7. | Make sure nozzles are not obstructed in any way preventing proper discharge of gas. | √ | |
| 8. | Check supports are tighten installed as approved details. | √ | |
| 9. | Check approved pipes marling's (identifications), tags, labs of system are installed. | | (1) |

***Comments:***

***Note:***

(1) No warning instructions, labelling and tags in the protected area. Add warning signs as per specs. "SPC-FD-17-G00-212200", sec. 3.6 "Labelling", "however, this comment is not affecting the functional test".
(2) Fire alarm system and BMS are not commissioned yet. However, fire alarm system was ready and tested during the test.
(3) Cables labels around and inside the FM200 panel are not installed yet

***Signatures:***

| | | | | | |
|---|---|---|---|---|---|
| DAR/SCG Rep. | TCM | | TAB Rep. | TCM | Abdulla Osama |
| CSCEC Rep. | TCM | | Supplier Rep. | TCM | |

| System and Panel Information | | | | |
|---|---|---|---|---|
| **Type** | **Amount of Agent** | **Room Name** | **Floor** | **Location** |
| FM200 | **12 * 300 kg** | MDB ROOM 1-133 | 1ST | MDB Room 1-133 |
| **Panel Manufacturer** | **Serial No.** | | **Location** | |
| KIDDE | ARIES 2.0 | | MDB Room 1-133 | |
| **Primary Supply Disconnect Location / Panel # / Breaker #** | | | | |
| - | | | | |

| Cylinder(s) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Equip ID** | **Description/ Location** | | **Size** | | **Manufacturer Model** | | | | | |
| 90-100901-001 | MDB Room 1-133 | | 368 L | | KIDDE | | | | | |
| **Cylinder Fill** | | | | | | **Notes** | | | | |
| **Weight** | | | **Gauge Press** | **Swing Check Valve** | **Liquid Level** | | | | | |
| **Total** | **Tare** | **Agent** | | | | | | | | |
| 1587.30 KG | 3*229.10 KG | 3*300 KG | √ | √ | √ | --------- | | | | |
| 1587.30 KG | 3*229.10 KG | 3*300 KG | √ | √ | √ | | | | | |
| 1587.30 KG | 3*229.10 KG | 3*300 KG | √ | √ | √ | | | | | |
| 1587.30 KG | 3*229.10 KG | 3*300 KG | √ | √ | √ | | | | | |
| **Inspection – Service** | | | | | | | | | | |
| **Filled** | **Condition** | **Bracket** | **Gauge** | | **Tagged** | **Safety Cap** | **Hose** | **Supervisory switch** | **Solenoid** | **Solenoid Monitor** |
| √ | √ | √ | √ | | √ | √ | √ | √ | √ | √ |

| MDB ROOM (133) PART (1) OF (4) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Piping Network** | | | **Nozzle** | | | | | |
| **Pipe Type** | **Painting** | **Fixation** | **Average Press.** | **Over False ceiling** | **Under Raised Floor** | **No. Of Nozzles** | **Size Of Nozzle** | **Serial No.** |
| 40W | √ | √ | 6.784 bar | N/A | N/A | E1-N1 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.609 bar | N/A | N/A | E1-N2 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.609 bar | N/A | N/A | E1-N3 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.784 bar | N/A | N/A | E1-N4 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.785 bar | N/A | N/A | E1-N5 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.444 bar | N/A | N/A | E1-N6 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.444 bar | N/A | N/A | E1-N7 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.785 bar | N/A | N/A | E1-N8 | 50 mm | 90-194028-578 |

| MDB ROOM (133) PART (2) OF (4) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Piping Network** | | | **Nozzle** | | | | | |
| **Pipe Type** | **Painting** | **Fixation** | **Average Press.** | **Over False ceiling** | **Under Raised Floor** | **No. Of Nozzles** | **Size Of Nozzle** | **Serial No.** |
| 40W | √ | √ | 6.692 bar | N/A | N/A | E1-N1 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.541 bar | N/A | N/A | E1-N2 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.541 bar | N/A | N/A | E1-N3 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.692 bar | N/A | N/A | E1-N4 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 7.021 bar | N/A | N/A | E1-N5 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.668 bar | N/A | N/A | E1-N6 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.668 bar | N/A | N/A | E1-N7 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 7.021 bar | N/A | N/A | E1-N8 | 50 mm | 90-194028-578 |

| MDB ROOM (133) PART (3) OF (4) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Piping Network | | | Nozzle | | | | | |
| Pipe Type | Painting | Fixation | Average Press. | Over False ceiling | Under Raised Floor | No. Of Nozzles | Size Of Nozzle | Serial No. |
| 40W | √ | √ | 6.833 bar | N/A | N/A | E1-N1 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.665 bar | N/A | N/A | E1-N2 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.665 bar | N/A | N/A | E1-N3 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.833 bar | N/A | N/A | E1-N4 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 7.091 bar | N/A | N/A | E1-N5 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.331 bar | N/A | N/A | E1-N6 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.331 bar | N/A | N/A | E1-N7 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 7.091 bar | N/A | N/A | E1-N8 | 50 mm | 90-194028-578 |

| MDB ROOM (133) PART (4) OF (4) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Piping Network | | | Nozzle | | | | | |
| Pipe Type | Painting | Fixation | Average Press. | Over False ceiling | Under Raised Floor | No. Of Nozzles | Size Of Nozzle | Serial No. |
| 40W | √ | √ | 6.930 bar | N/A | N/A | E1-N1 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.765 bar | N/A | N/A | E1-N2 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.765 bar | N/A | N/A | E1-N3 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.930 bar | N/A | N/A | E1-N4 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.944 bar | N/A | N/A | E1-N5 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.607 bar | N/A | N/A | E1-N6 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.607 bar | N/A | N/A | E1-N7 | 50 mm | 90-194028-578 |
| 40W | √ | √ | 6.944 bar | N/A | N/A | E1-N8 | 50 mm | 90-194028-578 |

**Ok - Passes Inspection S - Serviced on site X - Requires Service N/A - Not Applicable**

***Comments:***

الشركة الهندسية لخدمات الضبط و الموازنة ذ.م.م

***Signatures:***

| | | | | | |
|---|---|---|---|---|---|
| DAR/SCG Rep. | TCM | | TAB Rep. | TCM | Abdulla Osama |
| CSCEC Rep. | TCM | | Supplier Rep. | TCM | |

# ATTACHMENT(2)

*Commissioning - Functional Check Sheet*

# COMMISSIONING - FUNCTIONAL CHECK SHEET
## For Clean Agent System FM200

| Function | Description | Test Result |
|---|---|---|
| **Power supply test** | | |
| Panel AC Power | Check Existing of AC Power with AC on green LED Lighting. | √ |
| Panel AC Power Loss | Loss of AC power to the alarm panel is detected by the alarm system. | √ |
| Panel AC Power Loss Response | Activate of internal panel buzzer and System TBL LED and PSU TBL Led Turn into yellow. | √ |
| **Battery test** | | |
| Panel Sec Power | Check Existing and Connection of Battery 2x12 v 7 AH. | √ |
| Battery autonomy test | Alarm test with battery full loaded for 15 mins | √ |
| | actuation and supervision functions with battery for minimum of 24 hours | √ |
| Battery autonomy test | Measure Battery voltage before and after full loaded 15 mins | √ |
| | Measure Battery voltage before and after minimum of 24 hours of actuation and supervision functions | √ |
| Panel Sec Power Loss | Loss of Secondary power to the alarm panel is detected by the alarm system. | √ |
| Panel AC Power Loss Response | Activate of internal panel buzzer and System TBL LED and PSU TBL Led Turn into yellow. | √ |
| **Earth Fault test** | | |
| Earth Fault Existing. | Ground faults in alarm and power circuits are detected. | √ |
| Earth Fault Response. | Activate of internal panel buzzer and System TBL LED and Ground TBL led Turn into yellow. | √ |
| **Initiating zone trouble test** | | |
| Open Alarm Circuits or Remove detector. | Electrical opens or removing detector in initiating and indicating circuits (zone 1 or zone 2) are detected. | √ |
| Open Alarm Circuits or Remove Detector Response. | Activate of internal panel buzzer, System TBL LED and ALM1 Or ALM2 TBL Led Turn into yellow. | √ |
| **Manual Release trouble test** | | |
| Open Manual Release Circuits or Remove Manual Release. | Electrical opens or removing Manual Release in initiating and indicating circuits are detected. | √ |
| Open Manual Release Circuits or Remove Manual Release Response. | Activate of internal panel buzzer, System TBL LED and MAN REL TBL Led Turn into yellow. | |
| **Abort switch trouble test** | | |
| Open Abort switch Circuits or Remove Abort switch. | Electrical opens or removing Abort switch in initiating and indicating circuits are detected. | √ |
| Open Abort switch Circuits or Remove Abort switch Response. | Activate of internal panel buzzer, System TBL LED Abort TBL Led Turn into yellow. | √ |
| **Notification Appliance trouble test** | | |
| Open Notification Appliance Circuits or Remove Notification Appliance. | Electrical opens or removing Notification Appliance are detected. | √ |
| Open Alarm Circuits Response | Activate of internal panel buzzer, System TBL LED and NAC1 TBL Or NAC2 TBL Or SUP1 TBL LED Turn into yellow as per location of trouble. | √ |
| **Release Circuit trouble test** | | |
| Open Release Circuits | Electrical opens in Release circuits are detected. | √ |
| Open Release Circuits Response | Activate of internal panel buzzer, System alarm LED and MAN REL and RELEASE Led Turn into yellow. | √ |
| Remove Electric Control Head | Remove Electrical Control Head are detected. | √ |
| Remove Electric Control Head Response | Activate of internal panel buzzer, System TBL LED and SUP1 TBL Led Turn into yellow. | √ |

## Alarm Device List

| Device | Installation and wiring | Zone / Address | Location/Description | Physical Condition | Functional Test |
|---|---|---|---|---|---|
| Smoke detector | √ | MDB Room | Inside | √ | √ |
| Multi detector (Heat Smoke) | √ | MDB Room | Inside | √ | √ |
| Manual Release Station | √ | MDB Room | Outside | √ | √ |
| Abort Switch | √ | MDB Room | Inside | √ | √ |
| Bell 6 Inch | √ | MDB Room | Outside | √ | √ |
| Horn/Strobe | √ | MDB Room | Inside | √ | √ |
| Main to Reserve Switch | N/A | MDB Room | N/A | N/A | N/A |
| Key Maintenance Switch | (1) | MDB Room | Inside | √ | √ |
| Remote Indication LED | × | MDB Room | × | × | × |

## Alarm Functions - Chemical Suppression

| 1st Alarm Test | A single initiating zone shows alarm. | | |
|---|---|---|---|
| **Action** | Done | Location | Note |
| Annunciate at Panel | √ | At Panel | |
| Activate Panel Buzzer | √ | At Panel | |
| Activate Alarm Bell | √ | Outside Room | |
| Illuminate Alarm Lamp | √ | At Panel | |
| Interface with fire alarm signal | √ | At Panel | (2) |
| Interface with BMS System | × | At Panel | NOT READY |
| Shutdown M.F.S. D | √ | Inside Room | |
| Interface with door access control | - | Outside Room | |
| Shutdown HVAC equipment | √ | Outside Room | |

| 2nd Alarm Test | A 2nd initiating zone shows alarm. | | |
|---|---|---|---|
| **Action** | Done | Location | Note |
| Annunciate at Panel | √ | At Panel | |
| Activate Panel Buzzer | √ | At Panel | |
| Activate Alarm Bell | √ | Outside Room | |
| Activate Horn | √ | Inside Room | |
| Activate Horn/Strobe | √ | Inside Room | |
| Illuminate "pre-discharge" lamp | N/A | N/A | |
| Start pre-set time delay | √ | At Panel | |
| Interface with fire alarm signal | √ | Inside Panel | (2) |
| Activate Signal to cold aisle containment control box to open all top windows | N/A | N/A | |

| | | |
|---|---|---|
| **Time Delay** | Delay from 2nd alarm (30 sec. as per specifications) to agent discharge. | √ |
| **Discharge Alarm** | Audible alarm upon agent discharge. | √ |
| **Solenoid Test** | Check solenoid status released or not. | √ |
| **Abort Switch** | Switch prevents discharge of chemical fire suppression agent. (10 sec) | √ |

## Releasing Test

| | | |
|---|---|---|
| **Time Delay** | Delay from 2nd alarm (30 sec. as per specifications) to agent discharge. | √ |
| **Discharge Alarm** | Audible alarm upon agent discharge. | √ |
| **Agent discharge** | Actual discharge of chemical fire suppression agent. | N/A |
| **Solenoid Test** | Check solenoid status released or not. | √ |
| **Abort Switch (Push & Hold)** | Abort Mode 1* (ANSI/UL 864) - Activation of the ABORT allows the pre-discharge timer to countdown normally, but stops and holds at 10 seconds (as per specifications) until the release of the ABORT and ABORT led turn into red color. | √ |

| Manual Release Test | Pull and Lift Manual Release shows alarm. | | |
|---|---|---|---|
| **Action** | Done | Location | Note |
| Annunciate at Panel | √ | At Panel | |
| Activate Panel Buzzer | √ | At Panel | |
| Activate Alarm Bell | √ | Outside Room | |
| Activate Horn/Strobe | √ | Inside Room | √ |
| Interface with fire alarm signal | √ | At Panel | (2) |
| Interface with BMS System | × | Inside Panel | System not ready |
| Shutdown Air Condition | √ | At Panel | |
| Shutdown MFSD | √ | Inside Room | |
| Close cold aisle containment | N/A | N/A | |

| | | |
|---|---|---|
| **Time Delay** | Manual release time delay (Immediately as per specifications) to agent discharge. | √ |
| **Discharge Alarm** | Audible alarm upon agent discharge. | √ |
| **Agent discharge** | Actual discharge of chemical fire suppression agent. | N/A |
| **Solenoid Test** | Check solenoid status released or not. | √ |
| **Abort Switch** | Switch prevents discharge of chemical fire suppression agent. (10 sec) | √ |
| **Supervisory test** | Activate supervisory status and check panel alarm actions. | √ |
| **Internal Buzzer** | | √ |

| Panel Inspection | | |
|---|---|---|
| **Description** | Yes | No |
| System was in operation upon arrival? | √ | |
| Panel and surrounding equipment, conduit and wiring well secured and in good condition | √ | |
| Are all lamps and displays operating correctly? | √ | |
| Primary power supply operates properly under full load? | √ | |
| Are drawings and wiring diagrams available at the panel? | | √ |
| Are operating instructions posted or available at the panel? | | √ |
| Are zones labeled and identified? | | √ (4) |

| Chemical Suppression Inspection | | |
|---|---|---|
| **Description** | Yes | No |
| Agent control heads or nozzles are in good condition and properly mounted? | √ | |
| All ceiling and floor panels are in place? | √ | |
| Warning signs are proper and visible? | | √ |

| Central Station Test | | |
|---|---|---|
| **Description** | Yes | No |
| 2 ND alarm condition indication tested and verified with the central station. | | √ |
| Trouble condition indication tested and verified with the central station. | | √ |
| Supervisory condition indication tested and verified with the central station. | | √ |
| Releasing Condition indication tested and verified with the central station. | | √ |

***Comments:***

(4) The FM 200 panel is an addressable type.

***Signatures:***

| | | | | | |
|---|---|---|---|---|---|
| DAR/SCG Rep. | TCM | | TAB Rep. | TCM | Abdulla Osama |
| CSCEC Rep. | TCM | | Supplier Rep. | TCM | |

| Commissioning Checks (FM 200 System Automatic Response test Procedure) | | Yes | No |
|---|---|---|---|
| **a) Activation of first detector (First Stage)** | | | |
| 1. | Activate any first detector on the protected area with smoke tester. | √ | |
| 2. | Check the panel is in the alarm mode and particular zone indicator led in the panel. | √ | |
| 3. | Ensure that the activation of the bell. | √ | |
| 4. | General fire signal FM200 signal will be triggered in the panel to intimate the fire alarm panel and shut down the AHU, FCU, Split units & motorized fire smoke dampers to achieve the room integrity. | √ | |
| **b) Activation of second detector (Second Stage)** | | | |
| 1. | Activate any second detector on the protected area with heat tester. | √ | |
| 2. | Check the panel is in the alarm mode and particular zone indicator led in the panel. | √ | |
| 3. | Activation of the horn/strobe inside the protected area. | √ | |
| 4. | Automatically panel countdown time will start to count 30 second delay time. | √ | |
| 5. | Ensure the activation of the strobe and solenoid actuator, after the completion of the countdown time 30 seconds. | √ | |
| 6. | Discharge o/p signal will be trigged in the panel to intimate the fire alarm panel for agent release. | √ | |
| **c) Manual Release Station** | | | |
| 1. | Activate the Manual release station outside the protected area. | √ | |
| 2. | Ensure that panel is in alarm mode and particular indication led in the panel. | √ | |
| 3. | Ensure the immediate activation of the bell, horn/strobe (Immediately or select delay time as per end user requirement). | √ | |
| 4. | General fire signal o/p signal will be triggered in the panel to intimate the fire alarm panel and shut down the AHU, FCU, Split units & motorized fire dampers. | √ | |
| 5. | Discharge o/p signal will be triggered in the panel to intimate the fire alarm panel. | √ | |

***Signatures:***

| | | | | | |
|---|---|---|---|---|---|
| DAR/SCG Rep. | TCM | | TAB Rep. | TCM | Abdulla Osama |
| CSCEC Rep. | TCM | | Supplier Rep. | TCM | |

| d) | Abort Switch | | |
|---|---|---|---|
| 1. | After the activation of the second stage detector in the panel. | √ | |
| 2. | Activation of the horn/strobe inside the protected area. | √ | |
| 3. | Automatically panel countdown time will start to count down delay time (30 sec as per Specifications) | √ | |
| 4. | In between the delay time push and hold the abort switch to abort the activation of the solenoid actuator and hold time delay a 10sec. | √ | |
| 5. | Press the reset button in the panel to reset panel to normal condition. | √ | |
| 6. | Release of the abort switch without resetting panel will activate the countdown timer again in the panel for 10 seconds (as per UL requirements as per specifications) after the delay period solenoid actuator will be activated. | √ | |
| **e)** | **FM200 Battery Operation test procedure** | | |
| 1. | Disconnect AC power. | √ | |
| 2. | Allow control unit to operate on the batteries. | √ | |
| 3. | Measure the individual battery voltages. If any battery reads 1.5 V or more below its rated voltage, that battery should be replaced. | √ | |
| 4. | Press and hold Acknowledge and Signal Silence control switches simultaneously for two seconds. As long as both keys are pressed, the battery voltage is displayed for three seconds, and then the battery current. These alternate every three (3) seconds. | N/A | |
| 5. | The battery test will exit if either control switch is released, or if a control unit status change occurs. | √ | |
| 6. | BATTERY VOLTAGE DISPLAY<br>Battery voltage will show the units in Volts. | N/A | |
| 7. | BATTERY CHARGE CURRENT DISPLAY<br>Battery charge current will show the units in Amps. | N/A | |
| 8. | Battery autonomy test (alarm test for batteries in full load for 15 min) | √ | |
| 9. | Actuation and supervision functions for minimum 24 hours. | √ | |

***Signatures:***

| | | | | | |
|---|---|---|---|---|---|
| DAR/SCG Rep. | TCM | | TAB Rep. | TCM | Abdulla Osama |
| CSCEC Rep. | TCM | | Supplier Rep. | TCM | |

| Battery Test Readings For 15 Min | |
|---|---|
| For MDB Room 1-133 Panel | |
| Before the test | After the test |
| V1= 12.84 V | V1= 12.58 V |
| V2= 12.89 V | V2= 12.64 V |

| Battery Test Readings For 24 Hours | |
|---|---|
| For MDB Room 1-133 Panel | |
| Before the test | After the test |
| V1= 12.87 V | V1= 12.24 V |
| V2= 12.82 V | V2=12.18 V |

***Comments:***

- Battery test for 24 Hours was done separately.

***Signatures:***

| | | | | | |
|---|---|---|---|---|---|
| DAR/SCG Rep. | TCM | | TAB Rep. | TCM | Abdulla Osama |
| CSCEC Rep. | TCM | | Supplier Rep. | TCM | |

الشركة الهندسية لخدمات الضبط و الموازنة ذ.م.م

CSCEC Ltd.(Egypt) Only For RFI 22 JUN 2023 PART OF CBD PROJECT

# Request For Inspection

**Date:** 22-Jun-2023

**Request no.** RFI-CSCEC-17-E01-ME-01-0830-01

**Project No. & Title:** E18066-0200S - The Central Business District of the New Administrative Capital

| Employer: | Engineer: | Sub Consultant: | Contractor: |
|---|---|---|---|
| Arab Republic of Egypt<br>Ministry of Housing, Utilities and Urban Communities<br>New Urban Communities Authority | dar | SHAKER | 中国建筑股份有限公司<br>CHINA STATE CONSTRUCTION ENGRG. CORP. LTD |

We request your attendance to inspect the following works : integrity test of clesn agent fire supression system at MDB Room (1-133) @E01 : between ( E01/Y01TO E01/Y28 &E01/X09 TO E01/X10)

1. Type :Buildings ☐ Electrical ☑ Mechanical installations

2. **Inspection Time :** 10: 00 AM **Date :** 24/6/2023

| 3. **Location:** | Zone | Road | Stations | Structure | Other |
|---|---|---|---|---|---|
| | E01 | | | | |

4. **Inspection :** ◉ First ○ Second ○ Third

RECEIVED 22 JUN 2023 SCG C.U.C

5. **Purpose of Inspection :**

1. Electrical
- ☐ Setting out
- ☐ Furniture elect. culvert
- ☐ MV cables
- ☐ Street lighting cables
- ☐ Street lighting poles
- ☐ Telephone duct Bank
- ☐ TV cables
- ☐ Light fittings
- ☐ Sub-stations
- ☐ Civil works & finishings

2. Mechanical
- ☑ Mechanical installations
- ☐ Pumping stations
- ☑ Civil works & finishings

Others (specify)

Particular Details: DWG-CSCEC-17-E01-ME-FF-0026-00

Submitted by : Wang Rui Signature: 王瑞

6. **Inspection report :**

| | | Signature |
|---|---|---|
| ☐ Surveyor | 1-Test passed as per attached Results of FM200 system Enclosure integrity test report done by (Mesc) according to NFPA 2001FM200 system Enclosure integrity test procedure .<br>2- in parallel update MST with updated Check lists and procedures to be reference for all CBD /CUC project rooms<br>3- The system is ready for next operation functional test<br>4- Consider all comments not yet done of installation RFI during next step,otherwise will be snag list. | Khaled Awad-24-06-2023 |
| ☐ Elect. Eng. | | |
| ☑ Mech. Eng. | | |
| ☐ Civil Eng. | | Dar: Mohamed Abdelaziz/Tamer.ElBeltagy (26-06-2023) |
| ☐ | | |

Date/time of inspection : 21-06-2023

7. **Engineer's Representative Comments:**

Dar 25-06-2023

The works are : ☐ Approved ☑ Approved as Noted ☐ Rejected

Signature: Bahaa Shahin Date : 25/06/2023

Attach all relevant particular test forms

Approval shall not relieve Contractor of his liabilities under the Contract or constitute authorization of any change to Contract Documents.



dar

CSCEC Ltd (Egypt) Only For RFI
17 JUN 2023
PART OF CBD PROJECT

# Request For Inspection

Date: 17-Jun-2023

Request no. RFI-CSCEC-17-E01-ME-01-0830-00

Project No. & Title: E18066-0200S - The Central Business District of the New Administrative Capital

| Employer: | Engineer: | Sub Consultant: | Contractor: |
|---|---|---|---|
| Arab Republic of Egypt<br>Ministry of Housing, Utilities and Urban Communities<br>New Urban Communities Authority | dar | SHAKER | 中國建築股份有限公司<br>CHINA STATE CONSTRUCTION ENGRG. CORP. LTD |

We request your attendance to inspect the following works : Integrity test of clean agent fire supression system at MBD room （1-133）@E01：between（E01/Y01 TO E01/Y28&E01/X09 TO E01/X10）

1. **Type** :Buildings ☐ Electrical ☑ Mechanical installations

2. **Inspection Time** : 10：00a.m **Date** : 18/6/2023

| 3. **Location**: | zone | Road | Stations | Structure | Other |
|---|---|---|---|---|---|
| | E01 | | | | |

4. **Inspection** : ◉ First ○ Second ○ Third

5. **Purpose of Inspection** :

1. Electrical
- ☐ Setting out
- ☐ Furniture elect. culvert
- ☐ MV cables
- ☐ Street lighting cables
- ☐ Street lighting poles
- ☐ Telephone duct Bank
- ☐ TV cables
- ☐ Light fittings
- ☐ Sub-stations
- ☐ Civil works & finishings

2. Mechanical
- ☑ Mechanical installations
- ☐ Pumping stations
- ☐ Civil works & finishings

RECEIVED 17 JUN 2023 SCG C.U.C

Others (specify) RFI-CSCEC-17-E01-ME-01-0830-00

Particular Details

Submitted by . Yangshaotiao Signature:

6. **Inspection report** :

| | | Signature |
|---|---|---|
| ☐ Surveyor<br>☐ Elect. Eng.<br>☑ Mech. Eng.<br>☐ Civil Eng.<br>☐ | 1-The check lists& Results with the 3rd party inputs are missing as per comments on approved as noted MST of FM200 Enclosure integrity test procedure and kickoff meeting that held on 13-5-2023 with Mesc Supplier .<br>2-Work is not ready during time of inspection<br>3- in parallel update MST with updated Check lists and procedures to be reference for all CBD /CUC project rooms | Khaled Awad-18-06-2023 |

Date/time of inspection : 18-06-2023 Dar: Mohamed Abdelaziz/Tamer.ElBeltagy (20-06-2023)

7. **Engineer's Representative Comments:**

Dar 20-06-2023

The works are : ☐ Approved ☐ Approved as Noted ☑ Rejected

Signature Bahaa Shahin Date : 20/06/2023

Attach all relevant particular test forms

Approval shall not relieve Contractor of his liabilities under the Contract or constitute authorization of any change to Contract Documents.



dar

# Test Procedure.

## Project Information:

Project Name: CBD Project

Building Name: CUC Building E01

Room Name: MDB Room

Room No.: 133

Room Floor: first Floor

Date of Test: 21/6/2023

Technician: Ahmed A.Elghany

Witnessing Authority:

DAR:

SGC:

CESEC:

MESC:

| Inspector | DAR | SCG | CSCEC | MESC |
|---|---|---|---|---|
| Name | | | Abdelghany | Ahmed Abdelghany |
| DESIGNATION | | | | |
| SIGNATURE: | | | | |
| DATE: | | | 6/2023 | |

**Project** : CENTRAL BUSINESS DISTRICT – NEW ADMINISTRATIVE CAPITAL
**Contractor** : CSCEC
**Supplier** : MESC

# Check List for Integrity Test

| 1- Preliminary Preparations NFPA2001 ANNEX clause D.2.1. (Edition 2022) | | | | |
|---|---|---|---|---|
| **item** | **Specification** | **Check** | **Reading** | **Record** |
| 1 | Provide a description of the test. | √ | | |
| 2 | Advise the responsible individuals on time required for the test. | √ | | |
| 3 | Determine the staff needed (to control traffic flow, set HVAC, etc.). | √ | | |
| 4 | Determine the equipment required (e.g., ladders). | √ | | |
| 5 | Obtain a description of the HVAC system. | √ | | |
| 6 | Establish the existence of a false ceiling space and the size of ceiling tiles. | √ | | |
| 7 | Visually determine the readiness of the room withrespect to the completion of obvious sealing. | √ | | |
| 8 | Determine if conflict with other building trades will occur. | √ | | |
| 9 | Determine the size of doorways. | √ | | |
| 10 | Determine if conflict with other building trades will occur. | √ | | |
| 11 | Determine the existence of adequate return path area outside the enclosure envelope used to accept or supply the door fan air. | √ | | |
| 12 | Evaluate other conflicting activities in and around space (e.g, interruption to the facility being tested). | √ | | |
| 13 | Obtain appropriate architectural HVAC and system design documents. | √ | | |
| **2- Initial Enclosure Evaluation. NFPA2001 ANNEX clause D.2.4. (Edition 2022)** | | | | |
| **2.1 Inspection**. | | | | |
| 1 | Note the areas outside the enclosure envelope that will be used to supply or accept the door fan air. | √ | | |
| 2 | Inspect all openable doors, hatches, and movable partitions for their ability to remain shut during the test. | √ | | |
| 3 | Obtain or generate a sketch of the floor plan show- ing walls, doorways, and the rooms connected to the test space. Number or name each doorway. (page 9) | √ | | |
| 4 | Look for large attached volumes open to the test space via the floor or walls of the test space. Note volumes and apparent open connecting areas. | √ | | |
| 5 | Check floor drains and sink drains for traps with liquid. | √ | | |
| **2.2 Measurement of Enclosure.** | | | | |
| 1 | Measure the clean agent protected enclosure volume. Record all dimensions. Deduct the volume of large solid objects to obtain the net volume. | | | |
| 1.1 | Measurement of Enclosure Room Void | | | |
| | L (m) = 115.88 W (m) = 11.33 H (m) =5.21 | | | |
| 1.2 | Measurement of Enclosure False ceiling. | | | |
| | L (m) = NA W (m) =NA H (m) =NA | **X** | | |

| Inspector | DAR | SCG | CSCEC | MESC |
|---|---|---|---|---|
| Name | | | Abdelghany | Ahmed Abdelghany |
| DESIGNATION | | | | |
| SIGNATURE: | | | | |
| DATE: | | | 6/2023 | |

| | | | | |
|---|---|---|---|---|
| 1.3 | Measurement of Enclosure under Raised Floor /Trench. | | | |
| | L (m) = W (m) = H (m) = | | | |
| 2 | Measure the maximum flooded height H | **5.2 m** | | |
| 3 | Calculate the effective floor area by dividing the net clean agent protected volume by the maximum clean agent protected enclosure height. | **1315.4 m²** | | |
| 4 | Measure the clean agent protected enclosure volume. | **6840.3 m³** | | |
| 4.1 | Agent Quantity (Kg/Lb.) | **3630 kg** | | |
| 4.2 | Design Concentration (%) | **7%** | | |
| 5 | Measure the Minimum Protected height H. | **4.5 m** | | |
| 6 | Doorway Size. | | | |
| 6.1 | H = 2.2 m | | | |
| 6.2 | W =1.2 m | | | |
| 7 | Measure Altitude Level(Elevation Level with in 200 m). | **299** | | |
| 8 | Operation Temperature. | | | |
| | **2.3 Preparation** | | | |
| 1 | Advise supervisory personnel in the area about the details of the test. | √ | | |
| 2 | Remove papers and objects. | √ | | |
| 3 | Secure all doorways and openings as for a clean agent discharge. | √ | | |
| 4 | Open doorways inside the protected enclosure even though they could be closed upon discharge. | √ | | |
| 5 | Get the user's personnel and/or the clean agent contractor to set up the room in the same state as when a discharge would occur, that is, HVAC shut down, dampers closed, and so forth. Confirm diat all dampers and closable openings are in the discharge-mode position. | √ | | |
| | **2.4 Door Fan Installation.** | | | |
| 1 | The door fan apparatus generally consists of a single door fan. A double or multiple door fan for larger spaces or for neutralizing leakage through a suspended ceiling can be used for certain applications. | √ | | |
| 2 | Set up one fan unit in the most convenient doorway leading into the space. | √ | | |
| 3 | Follow the manufacturer's instructions regarding setup. Page 5 | √ | | |
| 4 | Before door fan installation, examine the sealing around the door that the door fan will be mounted in to deter- mine if significant leakage exists. If significant leaks are found, they should be corrected. | √ | | |
| 5 | Ensure that all pressure gauges are leveled and zeroed prior to connecting them to the fan apparatus. | √ | | |
| 6 | Connect the tubing for the room pressure gauge. Ensure the tube is at the floor slab elevation and extends at least 10 ft (3 m ) away from the outlet side of the door fan, away from its air stream path, and away from all significant air sUeams (i.e., HVAC air flows or openings where air flow could impinge on the tube). | √ | | |
| 7 | The door fan should be arranged to alternately blow out of (depressurize) and blow into (pressurize) the space. Both measurements should be taken | √ | | |

| Inspector | DAR | SCG | CSCEC | MESC |
|---|---|---|---|---|
| Name | | | Abdelghany | Ahmed Abdelghany |
| DESIGNATION | | | | |
| SIGNATURE: | | | | |
| DATE: | | | 6/2023 | |

<table>
<tr><td colspan="6"><u>3-Door Fan Enclosure Evaluation. NFPA2001 ANNEX clause D.2.6. (Edition 2022)</u></td></tr>
<tr><td>1</td><td colspan="3">Activate the fan and adjust the enclosure pressure to +15 Pa to determine the Correct range of hole opens.</td><td>√</td><td></td><td></td></tr>
<tr><td>2</td><td colspan="3">Inspect all dampers with smoke to ensure they are closing properly. Record problems and notify individuals responsible for the enclosure of the problems.</td><td>√</td><td></td><td></td></tr>
<tr><td>3</td><td colspan="3">Inspect doors and hatches to ensure correct closure. Record problems and notify individuals responsible for the enclosure of the problems</td><td>√</td><td></td><td></td></tr>
<tr><td>4</td><td colspan="3">Inspect the wall perimeter (above and below the false floor) and the floor slab for major leaks. Note location and size of major leaks. Track down major air flow currents.</td><td>√</td><td></td><td></td></tr>
<tr><td>5</td><td colspan="3">Decide the location of measurement gauge (Outside / Inside)</td><td>√</td><td>outside</td><td></td></tr>
<tr><td>6</td><td colspan="3">Bias Pressure Measurement $b_0$.(with in duration 10 to 30 Sec.) (NFPA2001 ANNEX clause D.2.6.2)</td><td>√</td><td>.9 Pa</td><td></td></tr>
<tr><td>7</td><td colspan="3">Door Fan Measurement.</td><td>√</td><td></td><td></td></tr>
<tr><td>7.1</td><td colspan="3">Test Pressurization Direction: (NFPA2001 ANNEX clause D.2.7.1.8 Edition 2022)</td><td>√</td><td></td><td></td></tr>
<tr><td></td><td colspan="3"><table>
<tr><td>Fan Range@50 Pa :</td><td>Type B8</td><td>Fan Range@50 Pa :</td><td>Type open</td></tr>
<tr><td colspan="2">Room Pressure -10 Pa:</td><td colspan="2">Room Pressure -50 Pa:</td></tr>
<tr><td>Fan Flow Reading (Pa):</td><td>114<br>112</td><td>Fan Flow Reading (Pa):</td><td>53<br>48.9</td></tr>
<tr><td>Fan Flow Reading (CFM):</td><td>1461<br>1446</td><td>Fan Flow Reading (CFM):</td><td>3959<br>3802</td></tr>
</table></td><td></td><td></td><td></td></tr>
<tr><td>7.2</td><td colspan="3">Test Depressurization Direction: (NFPA2001 ANNEX clause D.2.7.1.8 Edition 2022)</td><td></td><td></td><td></td></tr>
<tr><td></td><td colspan="3"><table>
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<tr><td colspan="2">Room Pressure +10 Pa:</td><td colspan="2">Room Pressure +50 Pa:</td></tr>
<tr><td>Fan Flow Reading (Pa):</td><td>165.5<br>157.5</td><td>Fan Flow Reading (Pa):</td><td>91.8<br>92.6</td></tr>
<tr><td>Fan Flow Reading (CFM):</td><td>1721<br>1673</td><td>Fan Flow Reading (CFM):</td><td>3481<br>3510</td></tr>
</table></td><td></td><td></td><td></td></tr>
</table>

| Inspector | DAR | SCG | CSCEC | MESC |
|---|---|---|---|---|
| Name | | | Abdelghany | Ahmed Abdelghany |
| DESIGNATION | | | | |
| SIGNATURE: | | | | |
| DATE: | | | 6/2023 | |

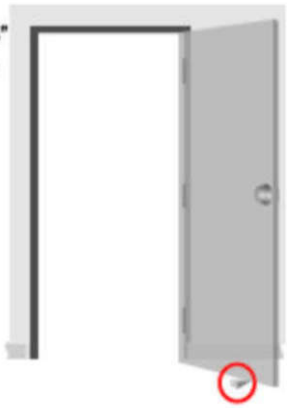
**Door Fan Installation NFPA2001 ANNEX clause D.2.5 and Retrotec Quick Guide-DoorPanel Modular-QG210 .**.

## 1. TESTING PROCEDURE AS PER THE MANUFACTURE PUBLISHED DATA:

### 1. Secure the door in the open position

1.1 Select a doorway, between 32" to 48,75" in width, and 76.5" to 87" in height.

1.2 The door must be held open securely during testing.



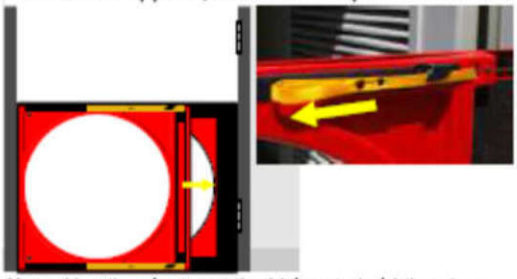
### 2. Determine panel placement

2.1 Install the modular door panels on the opposite side of the door frame from the door.
2.2 Orient the panels so that the panel extends towards the door hinges.

### 4. Install the fan panel

4.1 Place the fan panel in the bottom position, extending towards the hinges.

4,2 Pull the yellow straps firmly to tighten. With tension still applied, hook the strap into the cleat.

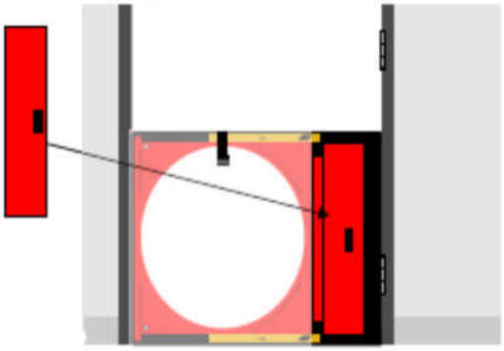


***Note:*** Use the cleat, not the Velcro to hold the strap. Tug on the panel to see if it's secure.

### 5. Install the filler sheet and strap

5.1 Place the appropriate filler sheet to cover any gap that is created by extending the fan panel. Press the sheet firmly to seal.

5,2 Loop and attach the fan strap around the top-center of the panel.



| Inspector | DAR | SCG | CSCEC | MESC |
|---|---|---|---|---|
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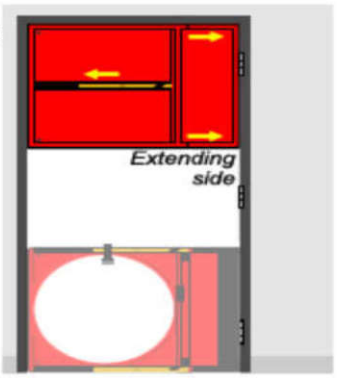
| DESIGNATION | | | | |
| SIGNATURE: | | | | |
| DATE: | | | 6/2023 | |

## 3. Unpack door panels from the case

3,1 Remove the modular panels from the case, as needed.
3.2 The set includes the Fan panel, a fan strap, two fan panel filler sheets, an XY panel, and a Large-X panel.
3.3 Optional Small-X panels are also available for over-height doors exceeding 87 inches (221 cm).

## 6. Install the large X panel

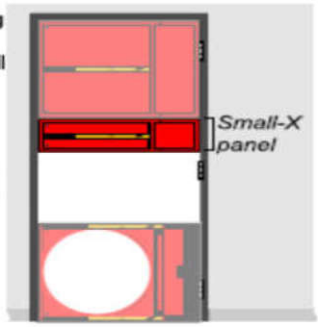
6.1 Using the same technique as you did for the fan panel, install the Large-X panel into the top position of the doorway.
6.2 Be certain to orient the panel to expand towards the door hinges.




***Tip:*** All panels and expanders should face the same direction.

## 7. Install optional Small-X panel

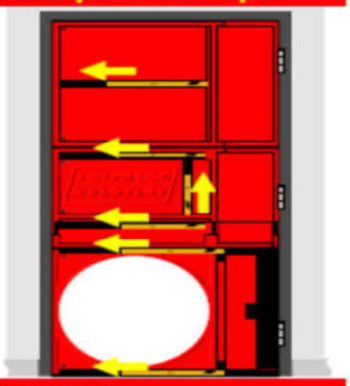
7.1 If the door opening exceeds 87 inches in height, order and install an optional Small-X panel directly below the large-X panel.
7.2 As an alternative, you may also carefully apply grill mask to seal small gaps between panels.




## 10. Tighten all panel expander straps

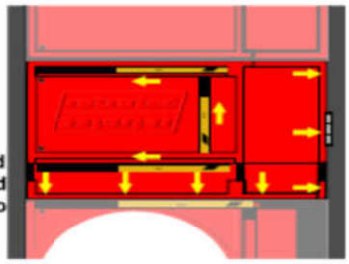
10.1 Check to ensure the expander straps on all panels are tight.
10.2 Panels should be tight enough to remain securely in place.

***Note:*** Once the Fan panel fill sheet is installed, it is difficult to tension the fan panel.



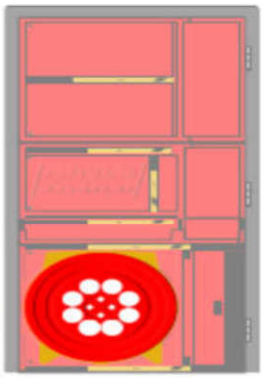
## 8. Place the XY panel in position

8.1 Loosen all straps on the XY panel and extend the two expanders to close the vertical and horizontal openings.
8.2 Loosely pull and hook the vertical and horizontal straps into the cleats to hold them in position.



## 11. Unpack and orient the fan

11.1 Lift the fan from its case and orient it for the test.
11.2 If the fan needs to be installed with the range plates facing away from the user, ensure that the desired range is set before installing the fan.



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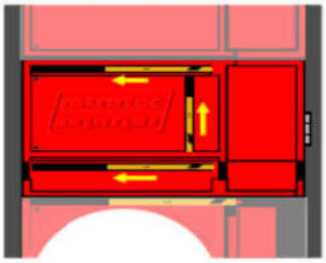
| DATE: | | | 6/2023 | |

## 9. Pull all the XY panel straps tight

9.1 Add tension to the XY panel expander straps.
9.2 Tighten the vertical expander strap first.
9.3 Then tighten the two horizontal expanders.



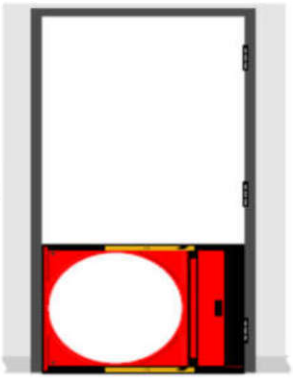
## 12. Install the fan and attach the fan strap

12.1 Holding the fan strap out of the way, align the fan with the opening and insert the bottom of the fan into the hole in the fan panel.
12.2 Gently push the tabs on the fan into the corresponding notches on the fan panel.
12.3 Rotate the fan clockwise slightly to lock it into position.
12.4 Hook the fan strap over the edge of the fan inlet to secure the fan in place.

## 13. Use Two Fans with a Second Fan Panel

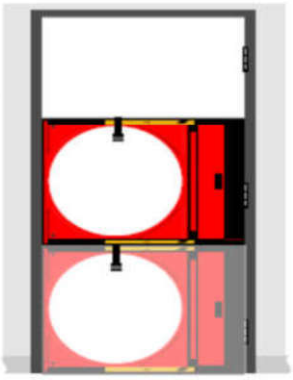
13.1 Two fans can be used with the Modular panels by installing a second fan panel.

13.2 Begin by installing the first fan panel and filler sheet.



13.3 Attach a fan strap to both fan panels.

13.4 Install a second fan panel directly above the first one.

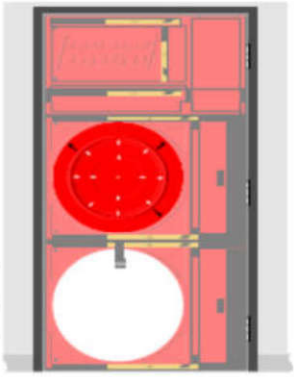


## 14. Using the Field Calibration Plate

14.1 The field calibration plate is used to check the accuracy of the test system.

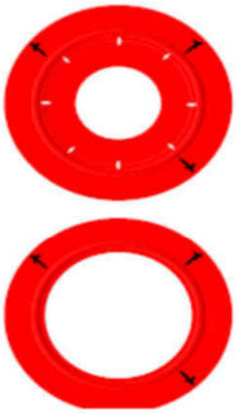
14.2 To install the calibration plate, fit the plate in the fan hole, and slide the black knobs towards the edge of the plate.

14,3 Twist the knobs to lock them in place.



14.4 The smallest hole in the calibration panel measures 50 square inches. To remove the small panel, twist the four white clips until the small panel can be removed.

14,5 The second hole in the calibration panel measure 144 square inches. Twist the eight white clips to remove.



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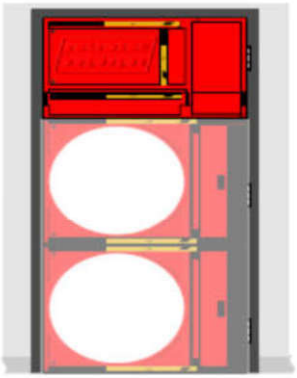
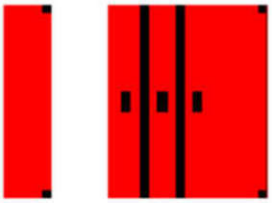
| DATE: | | | 6/2023 | |

13.5 Use the XY panel to fill the remaining gap,



## 15. Filler Sheet Options



15,1 Depending on the width of the doorway, select the correct filler sheet to cover the extending side of the fan panel.
15,2 The expandable filler sheet can be expanded to fit three different sizes,

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| Name | | | Abdelghany | Ahmed Abdelghany |
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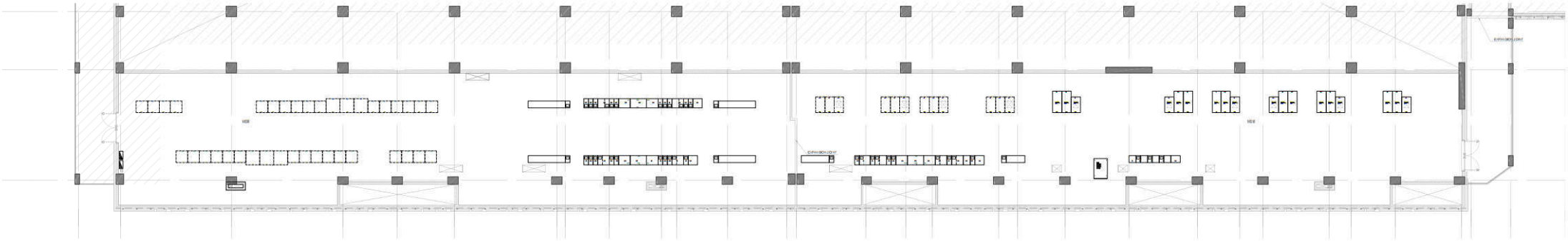


**MDB room(133) layout**

# Enclosure Integrity Test Report

In compliance with NFPA 2001 (2022 Edition) Annex D Enclosure Integrity Procedure

(using FSSA peak pressure equations)

*INSERT COMPANY LOGO*

MESC EGYPT

| | |
|---|---|
| Tested building: | CUC E01 |
| Tested enclosure: | MDB 133 Room |
| Building Address: | CBD Project - New Capital |
| Performed for: | |
| Performed by: | Abdelghany |
| Certification level | 3 |
| Test date: | 2023-06-21 |
| Associated Test file: | C:\Users\comen\Documents\Retrotec\Tests\NFPAED2022 2023-06-16 0125 CUC 133 MDP Room.fxml |

## Summary – MDB 133 Room

| | | |
|---|---|---|
| retrotec **FanTestic Integrity** | version: **5.14.82** | licensed to: **MESC EGYPT** |
| Test date: **2023-06-21** | By: **Abdelghany** | Certification: **3** |
| Location: **CBD Project - New Capital** | | Building: **CUC E01** |
| Witness: **DAR-SGC-CSCEC** | | |

| Enclosure conditions prior to discharge | |
|---|---|
| Net protected volume, V [m³] | **6,840.3** |
| Max flooded height, $H_o$ [m] | **5.21** |
| Required protected height, $H_p$ [m] | **4.5** |
| Design temp, T [C] | **21.0** |
| Enclosure pressure limit, [Pa] | **1,200** |
| Specified Hold Time, [min] | **10** |
| Elevation, [m] | **299** |
| Minimum design humidity | **30%** |
| Maximum design humidity | **60%** |

| Extinguishing agent details | |
|---|---|
| Agent | **FM200 (NFPA) [HFC-227ea]** |
| Quantity [kg] | **3,630** |
| Type | **Halocarbon** |
| Discharge time, [s] | **10** |
| Mixing during hold time | **No** |
| Initial concentration, $c_i$ | **7.0273%** |
| Design concentration, c | **7.0%** |
| Bias during Hold, $P_{bh}$ [Pa] | **0.9** |

| Test equipment | |
|---|---|
| Fan make/model | **Retrotec 6000** |
| Fan serial # | **3PH600361** |
| Fan calibration date | |
| Gauge make/model | **DM32** |
| Gauge serial # | **404563** |
| Gauge calibration date | **2023-01-16** |

| Hold time results | |
|---|---|
| Leakage exponent, n | **0.5359** |
| Leakage constant, $k_1$ [m³/h/Pa$^n$] | **1551** |
| Total Leakage Area, [cm²] | **5,947** |
| Predicted Hold Time, t [min] | **22.2** |

## Hold Time compliance based on Annex D of NFPA 2001 (2022 Edition)

Calculations predict that the enclosure will maintain the minimum concentration of 5.95% at the required protected height of 4.5 m for **22.2 minutes**. The enclosure **PASSES** this acceptance procedure because this hold time is greater than the specified minimum of 10 minutes.

## Peak Pressure compliance using FSSA equations

Calculations predict a maximum positive peak pressure of **507 Pa**. This pressure is less than the specified maximum enclosure pressure limit of 1,200 Pa, therefore the enclosure **PASSES** this part of the procedure

Calculations predict a maximum negative peak pressure of **1162 Pa**. This pressure is less than the specified maximum enclosure pressure limit of 1,200 Pa, therefore the enclosure **PASSES** this part of the procedure.

(-) PASSES - ELA for enclosure and vent of 6,512 cm² exceeds the minimum required ELA of 6,051 cm² and the peak pressure of 1162 Pa is less than the enclosure pressure limit of 1,200 Pa.
(+) PASSES - ELA for enclosure and vent of 6,512 cm² exceeds the minimum required ELA of 299 cm² and the peak pressure of 507 Pa is less than the enclosure pressure limit of 1,200 Pa.

## Assumptions and warnings

While FanTestic Integrity software may identify clean agent peak pressure and hold time risks, use of this software does not in any way guarantee the elimination of those risks.

## Enclosure Integrity (hold time)

The enclosure was tested in compliance with NFPA 2001 (2022 Edition) Annex D Enclosure Integrity Procedure. These tests only address potential failures in maintaining extinguishing agent concentration due to excessive enclosure leakage. The following assumptions were made:

- The initial extinguishing agent concentration as indicated in the test report will be achieved.
- Ductwork connected to air-handling systems that are outside this enclosure will be either isolated with dampers or will be shut down during the hold time.
- If air handlers are used to provide continuous mixing, they will be dedicated to this enclosure and will not create significant flows across the enclosure boundaries.
- An adequate return path for the air flow was provided during the enclosure integrity door fan tests.
- All intentional openings will be sealed during the enclosure leakage for hold time tests.
- Design temperature inside the tested enclosure during discharge is 21.0 C.
- There are NO fans that continue running during the hold time or heat sources that will produce enough air circulation to cause a 'continuous mixing' condition within the entire enclosure.
- All other non-integrity tests, as outlined in the NFPA standard, will be satisfactorily completed.

## Enclosure Integrity (peak pressure)

Enclosure integrity tests and calculations were performed to determine that the enclosure has adequate venting to provide peak pressure relief as required by NFPA 2001 (2022 Edition) section 5.

Calculations for peak pressure were performed using equations from the Fire Suppression Systems Association (FSSA) "Pressure Relief Vent Guide".

The following assumptions were made:

- All intentional openings will be set to the operating condition expected during the agent discharge for positive peak pressure relief when enclosure leakage is tested for positive vent area.
- In addition, for halocarbons only, all intentional openings will be set to the operating condition expected during the agent discharge for negative peak pressure relief when enclosure leakage is tested for negative vent area.
- Adequate air flow was provided along a path leading to outdoors for the test fan but the doors surrounding the enclosure were set in the position that provide the lowest air flow required to establish the required test pressures.
- Design temperature inside the tested enclosure during discharge is 21.0 C.
- Relative humidity in the enclosure will range between 30% and 60%.

msc مسك للاستشارات والخدمات الميكانيكية

# Background

## Hold time prediction, Descending Interface Model

This procedure predicts the hold time for the extinguishing agent/air interface to drop to the specified minimum protected height, based on the variables shown in this report. Due to the conservative assumptions regarding leakage distribution, this prediction model usually predicts a shorter retention time as compared to an actual discharge, but not always.

This prediction only applies to conditions as found at the time of the test. Additional penetrations, weather, open doorways, HVAC modifications, malfunctions and the inherent assumptions in the enclosure integrity procedure could all combine to give very different results in a real discharge.

## Leakage area defined for hold time

The Total Enclosure Leakage test measures all unintentional holes in the enclosure, the sub-floor and the above-ceiling space, whether or not extinguishing agent will leak out of these holes. All intentional openings (such as installed pressure relief vents) must be held in their closed position but not sealed. The measurement is performed over a range of pressures so that the exact leakage rate at lower pressures for agent loss will be known. The predicted hold time is worst case since it is assumed that half of the measured leakage is located in the ceiling and the other half is located in the floor.

## Leakage area defined for Peak Pressure

Leakage for peak pressure does not depend on leak location, making the Total Enclosure Leakage test accurate for peak pressure prediction. All intentional openings (such as installed pressure relief vents) must held in the positions they are expected to be in during the positive peak pressure spike during discharge. For halocarbons, this test must be repeated where all intentional openings (such as installed pressure relief vents) must held in the positions they are expected to be in during the negative peak pressure spike during discharge. The measurement is performed over a range of induced test pressures so that the exact leakage rate at the higher reference pressure of 125 Pa for venting will be known. The predicted peak pressure will then be based on an enclosure leakage that accurately represents the free vent area faced by the agent discharge.

# Discussion of Results – MDB 133 Room

## Hold Time

### Compliance with Annex D of NFPA 2001 (2022 Edition)

It is predicted that a Total Enclosure Leakage **measurement** of 5,947 cm² maintains the minimum concentration of 5.95% at the minimum protected height of 4.5 m for **22.2 minutes**. This hold time is greater than the specified minimum of 10 minutes, therefore the enclosure **PASSES** this acceptance procedure. It was assumed that there was no 'continuous mixing' condition during the hold time. Predicted hold time was therefore calculated based on a descending interface model.

The maximum leakage allowed in the enclosure that will still maintain a hold time of 10 minutes is 13,210 cm² (calculated at a reference pressure of 10Pa).

## Peak Pressure

### Compliance with section 5 of NFPA 2001 (2022 Edition)

5.3.7: *The protected enclosure shall have the structural strength and integrity necessary to contain the agent discharge. If the developed pressures present a threat to the structural strength of the enclosure, venting shall be provided to prevent excessive pressures.*
And that the following shall be submitted for approval to the authority having jurisdiction:
5.1.2.2 (10): *maximum positive and the maximum negative pressure... expected to be developed upon the discharge of agent*
5.1.2.2 (28): *pressure relief vent area... to prevent development of a pressure difference across the enclosure boundary that exceeds a specified enclosure pressure limit.*

Calculations for peak pressure, based on leakage area of **Enclosure Only** at a standard reference condition of 125 Pa and using no pressure relief vent (PRV), determined:

- The enclosure would represent a free vent area during discharge of 6,512 cm² with the enclosure set up in the condition expected to occur during the positive pressure pulse caused by the agent discharge which is predicted to be **507 Pa**. This pressure is less than the specified maximum of 1,200 Pa, therefore the enclosure **PASSES** this part of the procedure
- The enclosure would represent a free vent area during discharge of 6,512 cm² with the enclosure set up in the condition expected to occur during the negative pressure pulse caused by the agent discharge which is predicted to be **1162 Pa** . This pressure is less than the specified maximum of 1,200 Pa, therefore the enclosure **PASSES** this part of the procedure.

Vents should be installed high in the enclosure so that mostly air is exhausted, instead of the heavier extinguishing agent. Additionally, the vents should be rated to fully open between 80-130 Pa. Once a vent is installed or it is decided to use leakage of the enclosure only to relieve pressures during discharge, the chosen venting situation is used to calculate expected peak pressure, and the available free vent area must be enough to relieve this peak pressure in order to pass. All leakage areas are extrapolated to a standard reference condition of 125 Pa which is representative of conditions where most of the peak pressure will be relieved.

### Peak pressure calculation detail

Using the leakage area of **Enclosure Only** and equations from the Fire Suppression Systems Association (**FSSA**) "Pressure Relief Vent Guide":

- At the highest humidity of 60%, a peak positive pressure of approximately **507 Pa** would form.
- At the lowest humidity of 30%, a peak negative pressure of approximately **–1162 Pa** would form.

- (-) PASSES - ELA for enclosure and vent of 6,512 cm² exceeds the minimum required ELA of 6,051 cm² and the peak pressure of 1162 Pa is less than the enclosure pressure limit of 1,200 Pa.
  (+) PASSES - ELA for enclosure and vent of 6,512 cm² exceeds the minimum required ELA of 299 cm² and the peak pressure of 507 Pa is less than the enclosure pressure limit of 1,200 Pa.

### Free vent area required calculation detail

Assuming an Enclosure Pressure limit of ±1,200 Pa, this enclosure requires a total vent free area of **299 cm²** in the positive direction and **6,051 cm²** in the negative direction to maintain the enclosure's structural integrity.

### Free vent area available calculation detail

The leakage area during discharge will be:

- **6,512 cm²** for the **Enclosure Only** with the enclosure set up in its Positive Discharge Period Condition, where any dampers or installed PRV were fixed in the position they would assume under +125 Pa.
- **6,512 cm²** for the **Enclosure Only** with the enclosure set up in its Negative Discharge Period Condition, where any dampers or installed PRV were fixed in the position they would assume under -125 Pa.

### Additional PRV area required detail

The Enclosure Only provides 6,512 cm² of positive venting area. Since this is more than the required total of 299 cm², this enclosure **does not require any additional PRV area** to maintain structural integrity and pass the peak pressure procedure in the positive direction.

The Enclosure Only provides 6,512 cm² of negative venting area. Since this is more than the required total of 6,051 cm², this enclosure does **not require any additional PRV area** to maintain structural integrity and pass the peak pressure procedure in the negative direction.

## Test Data Appendix– MDB 133 Room

## Enclosure Construction Data

The maximum flooded height used in the calculations is 5.21 m. The equipment was installed in the room, and the top of the rack was measured to be 4.5 m, so 4.5 m was taken as the minimum height for protection. Net protected volume used is 6,840.3 m³. Building elevation used is 299 m, and the elevation correction factor used in the calculations is 0.965.

## Total Enclosure Leakage test data

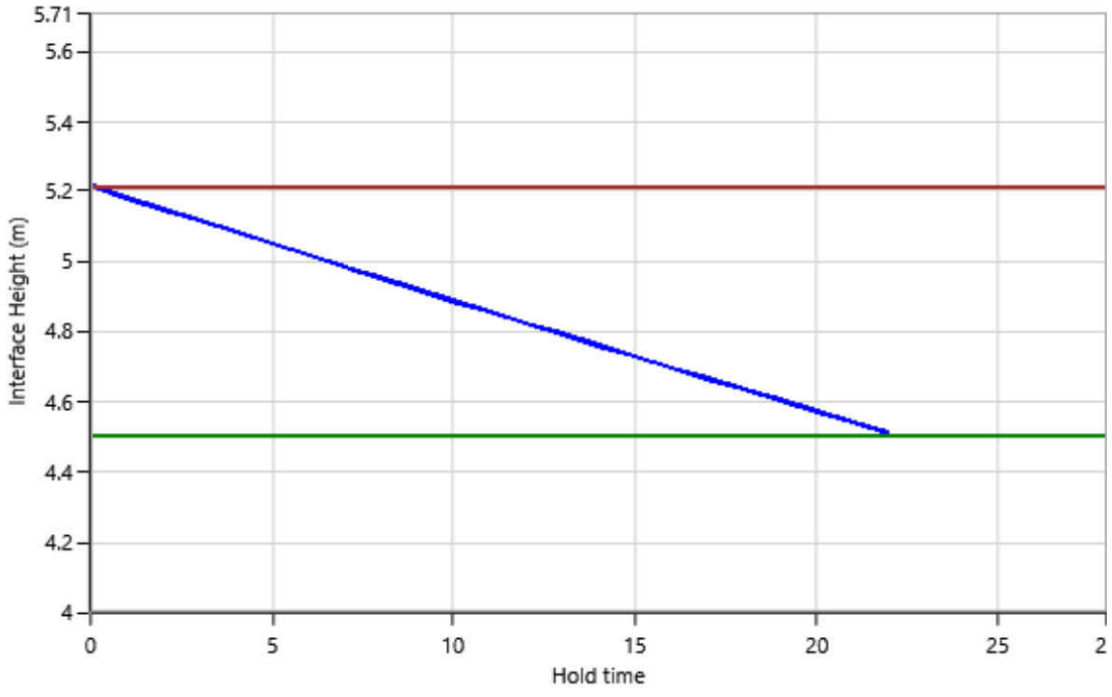
Based on **measured** values, the enclosure alone has an equivalent leakage area of **5,947 cm²** at a reference pressure of 10 Pa.

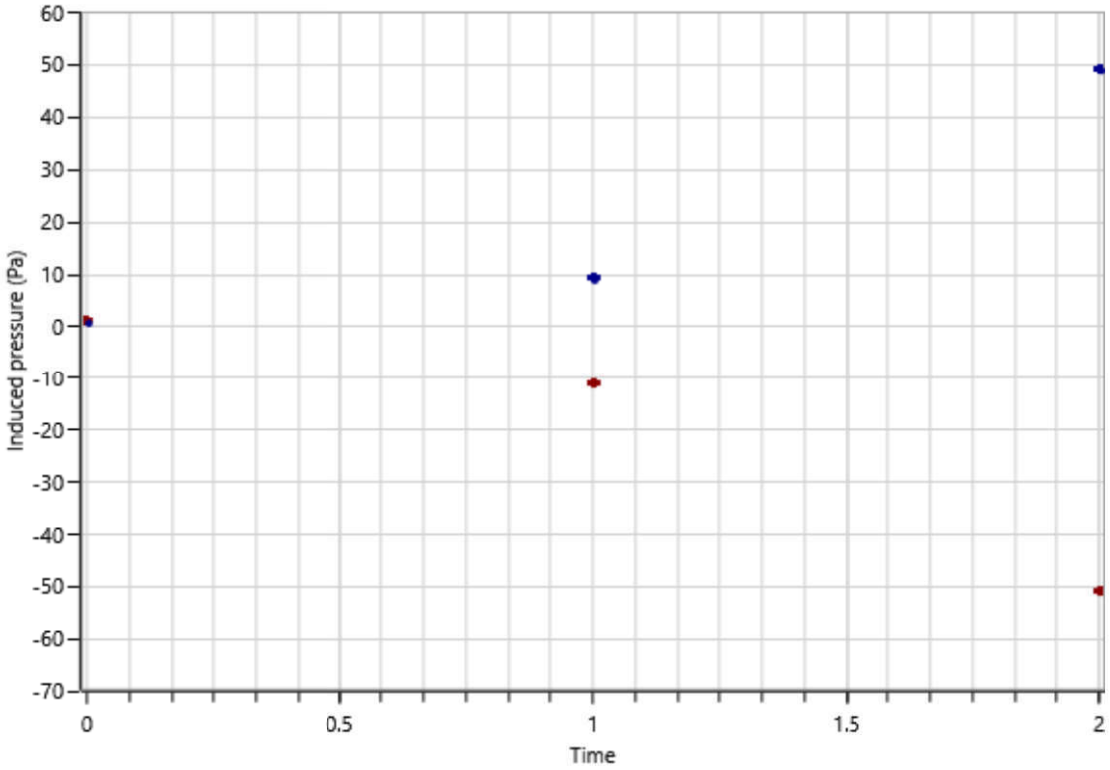
The following table represents the results from the enclosure integrity procedure carried out on the whole enclosure, with all intentional openings sealed.

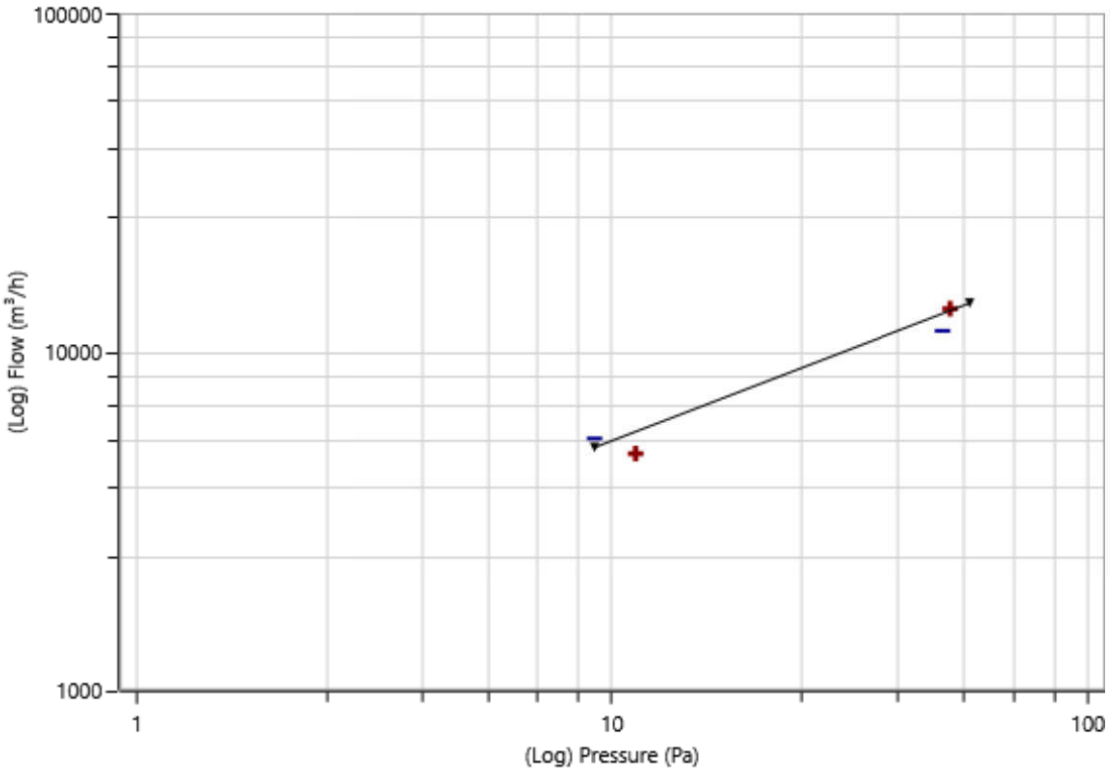
| Test conditions | | |
|---|---|---|
| Test date | Inside temperature, $T_e$ [C] | **21 C** |
| Test time | Outside temperature, | **40 C** |

| | | | |
|---|---|---|---|
| | | $T_o$ [C] | |
| Operator location | outside | Bias pressure, $P_{bt}$ [Pa] | **0.90** |

| | | Depressurize Data | | Pressurize Data | | |
|---|---|---|---|---|---|---|
| Measured pressure [Pa] | | 10.0 | 50.0 | | -10.2 | -50.0 |
| Induced pressure [Pa] | | 9.1 | 49.1 | | -11.1 | -50.9 |
| Fan #1, Range B8 | Fan Pressure [Pa] | 165.5 | | Fan #1, Range B8 | 114 | |
| | Flow [m³/h] | 2936 | | | 2483 | |
| Fan #2, Range B8 | Fan Pressure [Pa] | 157.5 | | Fan #2, Range B8 | 112 | |
| | Flow [m³/h] | 2854 | | | 2459 | |
| Fan #1, Range Open | Fan Pressure [Pa] | | 91.8 | 2- FPLDescription3 1 | | 53 |
| | Flow [m³/h] | | 5975 | | | 6725 |
| Fan #2, Range Open | Fan Pressure [Pa] | | 92.6 | Fan #2, Range Open | | 48.9 |
| | Flow [m³/h] | | 6031 | | | 6460 |
| Total Flow rate [m³/h] | | 5790 | 12010 | | 4942 | 13180 |
| Leakage exponent, n | | 0.433 | | | 0.644 | |
| Leakage characteristic, $k_1$ [m³/h/Pa$^n$] | | 2157.9 | | | 1081.4 | |
| Leakage area at 10 Pa [cm²] | | 6,525.36 | | | 5,323.03 | |
| Correlation, r | | 1.0000 | | | 1.0000 | |




Induced pressure (Pa)
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
0
0.5
1
1.5
2
Time


(Log) Flow (m³/h)
100000
10000
1000
1
10
100
(Log) Pressure (Pa)

## Venting data for Enclosure Only

There was no PRV installed for pressure relief so the Total Enclosure Leakage **measured** was extrapolated to the reference pressure of 125 Pa and used in further calculations as the only available leakage for peak pressure relief.

In the case where the leakage area of the PRV only was to be used for pressure relief, but leakage area for enclosure and vent was entered as the venting area dataset, to determine leakage area for pressure relief by PRV alone, the leakage of the enclosure would have been subtracted from the leakage of the venting dataset.

In the case where the leakage area of the enclosure and PRV was to be used for pressure relief, but leakage area for vent only was entered as the venting area dataset, to determine leakage area for pressure relief by the enclosure and PRV, the leakage of the enclosure would have been added to the leakage of the venting dataset.

### Positive direction data

The positive free vent area provided by the Enclosure Only is **6,512 cm²**, for the enclosure set up in its Positive Discharge Period Condition, with all dampers or installed PRV fixed in the position they would assume under +125 Pa.

The leakage of the Enclosure Only in the positive direction was obtained by **measuring**, and this leakage was manipulated as necessary to determine the leakage area of the Enclosure Only required for positive pressure relief.

### Negative direction data

The negative free vent area provided by the Enclosure Only is **6,512 cm²**, for the enclosure set up in its Negative Discharge Period Condition, with all dampers or installed PRV fixed in the position they would assume under -125 Pa.

The leakage of the Enclosure Only in the negative direction was obtained by **measuring**, and this leakage was manipulated as necessary to determine the leakage area of the Enclosure Only required for negative pressure relief.

## Peak Pressure data

Peak pressure was calculated using the leakage of the Enclosure Only and equations from the Fire Suppression Systems Association (FSSA) "Pressure Relief Vent Guide". FSSA equations depend on experimentally derived curves for peak pressure based on a Leak to Volume ratio for the enclosure.

(-) PASSES - ELA for enclosure and vent of 6,512 cm² exceeds the minimum required ELA of 6,051 cm² and the peak pressure of 1162 Pa is less than the enclosure pressure limit of 1,200 Pa.
(+) PASSES - ELA for enclosure and vent of 6,512 cm² exceeds the minimum required ELA of 299 cm² and the peak pressure of 507 Pa is less than the enclosure pressure limit of 1,200 Pa.

| Design details | |
|---|---|
| Enclosure pressure limit, [Pa]: | **1,200** |
| Discharge time, [s]: | 10 |
| Pressure relief vent type: | no pressure relief vent (PRV) |
| Peak Pressure relief using: | Enclosure Only |

| Peak Positive Pressure | Venting summary – Positive Direction |
|---|---|

| | |
|---|---|
| Peak positive pressure, [Pa] | **507** |
| Leak to volume ratio, $LVR_{pos}$ [cm²/m³] | 1.0 |

| | |
|---|---|
| Minimum required leakage, [cm²] | 299 |
| Venting area used, [cm²], (describes Enclosure Only) | 6,512 |
| Additional PRV area needed, [cm²] | **0** |

| Peak Negative Pressure | |
|---|---|
| Peak negative pressure, [Pa] | **1162** |
| Leak to volume ratio, $LVR_{neg}$ [cm²/m³] | 1.0 |

| Venting summary – Negative Direction | |
|---|---|
| Minimum required leakage, [cm²] | 6,051 |
| Venting area used, [cm²], (describes Enclosure Only) | 6,512 |
| Additional PRV area needed, [cm²] | **0** |

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## Test Equipment

The following test equipment was used in the performance of the enclosure integrity tests.

| | Fan | Fan serial | Fan location | Gauge | Gauge serial | Gauge Calibration |
|---|---|---|---|---|---|---|
| #1 | Retrotec 6000 | 3PH600361 | CBD Project | DM32 | 404563 | 2023-01-16 |
| #2 | Retrotec 6000 | 3PH600355 | CBD Project | DM32 | 406024 | 2018-02-01 |

## Fan Calibration Certificate Retrotec 6000:

**Retrotec 6000 3PH600361 Fan last calibrated: (Flow Equation Parameters - 3PH600361B1) . Published Flow Equation Parameters, Round B1. CFM**

| Range | n | K | K1 | K2 | K3 | K4 | MF |
|---|---|---|---|---|---|---|---|
| **Open** | 0.498 | 548 | 0 | 0.5 | 0 | 1 | 25 |
| **A** | 0.502 | 287 | 0 | 0.5 | 0 | 1 | 25 |
| **B8** | 0.54 | 113.25 | 0 | 0.8 | 0 | 1 | 40 |

| Polynomial Range | g | f | a | b | c | d | K2 | MF |
|---|---|---|---|---|---|---|---|---|
| **B4** | 0 | 0.7 | 0.00000662 | -0.0078 | 4.75 | 205 | 0.8 | 40 |
| **B2** | 40 | 0.85 | 0.000003 | -0.0037 | 2.2 | 49 | 1 | 50 |
| **B1** | 65 | 0.2 | 0.00000106 | -0.001382 | 0.96511 | 38.5 | 1 | 60 |
| **B74** | 25 | 0.15 | 0.000000796 | -0.00095 | 0.59 | 18 | 0.8 | 35 |
| **B47** | 25 | 0.09 | 0.000000269 | -0.0003591 | 0.2435 | 12.05 | 1 | 50 |
| **B29** | 25 | -0.02 | 0.000000111 | -0.000149 | 0.092 | 4.4 | 0.6 | 50 |

## Fan Calibration Certificate Retrotec 6000:

**Retrotec 6000 3PH600355 Fan last calibrated: (Flow Equation Parameters - 3PH600355B1) . Published Flow Equation Parameters, Round B1. CFM**

| Range | n | K | K1 | K2 | K3 | K4 | MF |
|---|---|---|---|---|---|---|---|
| **Open** | 0.498 | 548 | 0 | 0.5 | 0 | 1 | 25 |
| **A** | 0.502 | 287 | 0 | 0.5 | 0 | 1 | 25 |
| **B8** | 0.54 | 113.25 | 0 | 0.8 | 0 | 1 | 40 |

| Polynomial Range | g | f | a | b | c | d | K2 | MF |
|---|---|---|---|---|---|---|---|---|

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **B4** | 0 | 0.7 | 0.00000662 | -0.0078 | 4.75 | 205 | 0.8 | 40 |
| **B2** | 40 | 0.85 | 0.000003 | -0.0037 | 2.2 | 49 | 1 | 50 |
| **B1** | 65 | 0.2 | 0.00000106 | -0.001382 | 0.96511 | 38.5 | 1 | 60 |
| **B74** | 25 | 0.15 | 0.000000796 | -0.00095 | 0.59 | 18 | 0.8 | 35 |
| **B47** | 25 | 0.09 | 0.000000269 | -0.0003591 | 0.2435 | 12.05 | 1 | 50 |
| **B29** | 25 | -0.02 | 0.000000111 | -0.000149 | 0.092 | 4.4 | 0.6 | 50 |

Fan Pressure (FP) is the measured fan pressure when using a self-referenced fan or when Room Pressure (RP) is negative. If using a fan which is not self-referenced, and Room Pressure is positive, Fan Pressure is calculated by subtracting the measured Room Pressure from the Absolute Value of the Fan Pressure.

If PrA>0 and fan is not self-referencing: FP = |PrB|-PrA
If PrA<0 or fan is self-referencing: FP = PrB

Flow calculations are not valid if Fan Pressure is less than either MF or (K2 x |RP|).

Flow in CFM using the flow equation parameters shown above is calculated as follows for standard Ranges:

$$flow = (FP - (|RP| \times K1))^N \times (K + (K3 \times FP))$$

Flow in CFM using the polynomial flow equation parameters shown above is calculated as follows:

$$flow = (a \times FP^3) + (b \times FP^2) + (c \times FP) + d + ((g - |RP|) \times f)$$

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CSCEC Ltd (Egypt) Only For RFI 10 JUN 2023 PART OF CBD PROJECT

# Request For Inspection

**Date:** 10-Jun-2023

**Request no.** RFI-CSCEC-17-E01-ME-GF-0819-00

**Project No. & Title:** E18066-0200S - The Central Business District of the New Administrative Capital

| Employer: | Engineer: | Sub Consultant: | Contractor: |
|---|---|---|---|
| Arab Republic of Egypt<br>Ministry of Housing, Utilities and Urban Communities<br>New Urban Communities Authority | dar | SHAKER CONSULTANCY GROUP | 中国建筑股份有限公司<br>CHINA STATE CONSTRUCTION ENGRG. CORP. LTD |

We request your attendance to inspect the following works : puff test above ground floor FM-200 fire suppression system at MBD room （1-133）@E01：between（E01/Y01 TO E01/Y28&E01/X09 TO E01/X10）

1. **Type** :Buildings ☐ Electrical ☑ Mechanical installations

2. **Inspection Time** : 10：00a.m **Date** : 11/6/2023

| 3. **Location**: | zone | Road | Stations | Structure | Other |
|---|---|---|---|---|---|
| | E01 | | | | |

4. **Inspection** : ◉ First ○ Second ○ Third

5. **Purpose of Inspection** :

1. Electrical
- ☐ Setting out
- ☐ Furniture elect. culvert
- ☐ MV cables
- ☐ Street lighting cables
- ☐ Street lighting poles
- ☐ Telephone duct Bank
- ☐ TV cables
- ☐ Light fittings
- ☐ Sub-stations
- ☐ Civil works & finishings

2. Mechanical
- ☑ Mechanical installatio
- ☐ Pumping stations
- ☐ Civil works & finishin

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Others (specify) RFI-CSCEC-17-E01-ME-01-0819-00

Particular Details

Submitted by : WANG RUI Signature:

6. **Inspection report** :

| | | Signature |
|---|---|---|
| ☐ Surveyor<br>☐ Elect. Eng.<br>☑ Mech. Eng.<br>☐ Civil Eng.<br>☐ | 1-Accepted as visual inspection for Puff flow Test but comments of of RFI still valid to be consider ,otherwise will be snag list<br>2- remove all visual control devices used in Puff Test(plastic bags),otherwise will be snag list.<br>3-Cleaning all plumbing and firefighting pipes and supports from scratch, Arch Finishing paint, otherwise will be snag list.<br>4- Move obstructed Seismic supprot away from nozzles to ensure from smooth operation /distrubation of gas without any obstrctuion. | Khaled Awad-11-06-2023 |

Date/time of inspection : 11-06-2023 Dar: Mohamed Abdelaziz/Tamer.ElBeltagy (12-06-2023)

7. **Engineer's Representative Comments:**

The works are : ☐ Approved ☑ Approved as Noted ☐ Rejected

Signature Bahaa Shahin Date : 12/06/2023

Attach all relevant particular test forms

Approval shall not relieve Contractor of his liabilities under the Contract or constitute authorization of any change to Contract Documents.



dar

CSCEC Ltd.(Egypt)
Only RFI
29 MAY 2023
PK17 OF CBD PROJECT

# Request For Inspection

Date: 29-May-2023

Request no. RFI-CSCEC-17-E01-ME-01-0787-00

**Project No. & Title:** E18066-0200S - The Central Business District of the New Administrative Capital

| Employer: | Engineer: | Sub Consultant: | Contractor: |
|---|---|---|---|
| Arab Republic of Egypt<br>Ministry of Housing, Utilities and Urban Communities<br>New Urban Communities Authority | dar | SHAKER | 中国建筑股份有限公司<br>CHINA STATE CONSTRUCTION ENGRG. CORP. LTD |

We request your attendance to inspect the following works : pressure test of above ground FM-200 fire supression system at MDB Room (1-133) @E01 : between ( E01/Y01TO E01/Y28 &E01/X09 TO E01/X10)

1. **Type** :Buildings ☐ Electrical ☑ Mechanical installations

2. **Inspection Time** : 10: 00 AM **Date** : 30/5/2023

| 3. **Location**: | Zone | Road | Stations | Structure | Other |
|---|---|---|---|---|---|
| | E01 | | | | |

4. **Inspection** : ◉ First ○ Second ○ Third

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29 MAY 2023
SCG
C.U.C

5. **Purpose of Inspection** :

1. Electrical
- ☐ Setting out
- ☐ Furniture elect. culvert
- ☐ MV cables
- ☐ Street lighting cables
- ☐ Street lighting poles
- ☐ Telephone duct Bank
- ☐ TV cables
- ☐ Light fittings
- ☐ Sub-stations
- ☐ Civil works & finishings

2. Mechanical
- ☑ Mechanical installations
- ☐ Pumping stations
- ☑ Civil works & finishings

Others (specify)

Particular Details DWG-CSCEC-17-E01-ME-FF-0026-00

Submitted by : Wang Rui Signature: 王瑞

6. **Inspection report** : **Signature**

- ☐ Surveyor
- ☐ Elect. Eng.
- ☑ Mech. Eng.
- ☐ Civil Eng.
- ☐

1-Accepted as visual inspection for pressure test ,but comment of installation RFI still valid
2- all comments of installation RFI shall be released before Puff Test,otherwise RFI will be rejected.

Khaled Awad-30-05-2023

Dar: Mohamed FAbdelaziz/ Tamer.ElBeltagy (03-06-2023)

Date/time of inspection 30-05-2023

7. **Engineer's Representative Comments:**

DAR 04-06-2023

The works are : ☐ Approved ☑ Approved as Noted ☐ Rejected

Signature Bahaa Shahin Date : 04/06/2023

Attach all relevant particular test forms

Approval shall not relieve Contractor of his liabilities under the Contract or constitute authorization of any change to Contract Documents.



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CSCEC Ltd.(Egypt)
Only For RFI
21 MAY 2023
PK17 OF CBD PROJECT

# Request For Inspection

Date: 21-May-2023

Request no. RFI-CSCEC-17-E01-ME-01-0753-01

Project No. & Title: E18066-0200S - The Central Business District of the New Administrative Capital

| Employer: | Engineer: | Sub Consultant: | Contractor: |
|---|---|---|---|
| Arab Republic of Egypt<br>Ministry of Housing, Utilities and Urban Communities<br>New Urban Communities Authority | dar | SHAKER CONSULTANCY GROUP | 中國建築股份有限公司<br>CHINA STATE CONSTRUCTION ENGRG. CORP. LTD |

We request your attendance to inspect the following works : mechanical installation of above ground floor FM-200 fire suppression system at MBD room （1-133）@E01：between （E01/Y01 TO E01/Y28&E01/X09 TO E01/X10）

1. **Type** :Buildings ☐ Electrical ☑ Mechanical installations

2. **Inspection Time** : 10：00a. m **Date** : 22/5/2023

| 3. **Location**: | zone | Road | Stations | Structure | Other |
|---|---|---|---|---|---|
| | E01 | | | | |

4. **Inspection** : ◉ First ○ Second ○ Third

5. **Purpose of Inspection** :

1. Electrical
- ☐ Setting out
- ☐ Future elect. culvert
- ☐ MV cables
- ☐ Street lighting cables
- ☐ Street lighting poles
- ☐ Telephone duct Bank
- ☐ TV cables
- ☐ Light fittings
- ☐ Sub-stations
- ☐ Civil works & finishings

2. Mechanical
- ☑ Mechanical installa
- ☐ Pumping stations
- ☐ Civil works & finish

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Others (specify) RFI-CSCEC-17-E01-ME-01-0753-01

Particular Details

Submitted by : WANG RUI Signature: 王 强

6. **Inspection report** :

| | | Signature |
|---|---|---|
| ☐ Surveyor | | |
| ☐ Elect. Eng. | | |
| ☑ Mech. Eng. | 1-Refer to comments on attached A4 sheet of comments and comments on attached AS-Built sketches.<br>2- All comments shall be released before next stage of hydrostatic pressure test and puff test,oherwise RFI of next stage will be rejected. | Khaled Awad-22-05-2023 |
| ☐ Civil Eng. | | |
| ☐ | | |

Date/time of inspection : 22-05-2023:Time10:30 AM

Dar:Mahmoud Salah/Shady El Sayed/ Tamer.ElBeltagy(28-05-2023)

7. **Engineer's Representative Comments:**

Dar 28/05/2023

The works are : ☐ Approved ☑ Approved as Noted ☐ Rejected

Signature Bahaa Shahin Date : 28/05/2023

Attach all relevant particular test forms

Approval shall not relieve Contractor of his liabilities under the Contract or constitute authorization of any change to Contract Documents.



dar

**SCG Comments on RFI-CSCEC-17-E01-ME-01-0753-01- Installation Fire fighting FM200 (E01– First –Room# 133-MDB room- Code (B)**

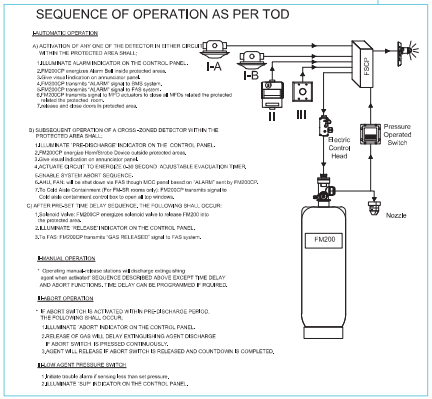
1- Refer to same common comments on RFI-CSCEC-17-E01-ME-GF-0563-04 of obstruction , Modified As-Built /calculation, supports, painting.
2- **For Nozzle placement: Follow** Manufacturer installation Guide manual rules for obstruction and nozzles installation and the Coverage and height limitations per each nozzle to ensure proper agent distribution.
3- Refer to comments on attached sketches
4- The contractor must provide all missing accessories of the system
5- contractor is responsible for coordinate between all trades.
6- Cylinders Fixation (Missing supports, brackets, accessories) IF ANY
7- The Nozzles mut be located far away from obstructions/walls as per Manufacture installation guide (180-degree Nozzles must located between limit 25 to 35 cm from wall
8- The Nozzles mut be located far away from obstructions/wall as per Manufacture installation guide at least (4 feet=120 cm to 6 feet =180 cm of clearance from walls and /or significant obstruion ex( columns, high rise rack).
9- Connection between cylinder & pipe must be complete after pressure test of pipes.
10- The FM200 nozzles are out of inspection (Not accepted to install Nozzles before submit RFI and approved hydrostatic Test)
11- Puff Test /Flow test shall be done after approved piping hydrostatic pressure Test and after install FM200 Nozzle as per specs and NFPA2001 and approved MST (this test should be sufficient to verify that each and every nozzle is unobstructed)
12- All openings should be controlled by any application to secure that the volume of room should be sealed (for Enclosure integrity test requirements)
13- Provide sleeves & Sleeve Caulking and Packing materials and fire stop sealant material for all piping penetrate walls must consider.
14- All sleeves/openings around pipes should be closed with approved Material.
15- All Missing thrust supports for main Grooved fittings of fire line and branches should be proved as per approved SHD/CAL/Specs/NFPA 2001requirment.
16- Painting scheme should be applied on clean service of pipes as per approved material& CBD MST of painting.
17- Missing piping identification.
18- The electric control head, electric control head monitor and cylinder supervisory switch not yet installed /connected.
19- The interlock with alarm system and HVAC equipment, Motorized Fire smoke dampers and Motorized Shutter door FM200 system should be considered (Not Yet Done).
20- Provide missing The Annunciator Panel.
21- Check alignment of supports /pipes and secure for supports bolts
22- Provide missing approved U-Bolt of installed rigid supports.
23- Provide missing approved thrust supports (check comments on as built sketches)
24- Provide missing approved rigid supports. for horizontal pipe /vertical every change direction and for risers (check comments on as built sketches
25- Check for All loosed pipes without any supports as indicated on approved SHD and bad painting.
26- All white Teflon shall be painted with final paint
27- All e**xposed Linen and Teflon from threaded** fittings should be **trimmed and cut**.
**28-** All Cuts edges of Galvanized steel supports shall be coated by **Zinc Rich coating (If any)**
29- All threaded rods& hanger supports nuts should be secured and tight.
30- Distance of last swivel support of each branch before elbow of each nozzle should not **exceed 30 cm** as per FM 200 manufacturer installation guide.
31- Last threaded rod of last swivel support of each branch before elbow of nozzle should be extended and touching the branch.
32- All the bad pipes primer paint must be repaired and painted before the final layer of red paint
33- All threaded rods of hanger support must be alignment and straightened vertically (perpendicular to the pipe center line).
34- All firefighting pipes (main lines, branches, elevation /drops of Nozzel heads) should be alignment.

35- All installed **Wrong sizes&** Types of Supports on branches should be changed by corrected size, otherwise will be snag list(IF ANY).
36- Contractor is responsible to Avoid obstruction of final location of FM200 Nozzle and HVAC equipment and Cable trays and Duct work) and electrical work & beams of room as per NFPA requirements.
37- Cleaning and final coat for all pipes should be **touched up (Typical)**
38- The pervious items should be installed before testing and commissioning.
39- Provide protection method for cylinders/ Solenoid valves /manual release and protect them from tampering and misuse.
40- The Contractor is responsible to comply with all local Civil defense comments /requirement without any extra cost.

# AS-BUILT SHOP DRAWINGS

1-Refer to comments on attached A4 sheet of comments and comments on attached AS-Built sketches.
2- All comments shall be released before next stage of hydrostatic pressure test and puff test,oherwise RFI of next stage will be rejected.

## SEQUENCE OF OPERATION AS PER TOD




**AUTOMATIC OPERATION**

A) ACTIVATION OF ANY ONE OF THE DETECTOR IN EITHER CIRCUIT WITHIN THE PROTECTED AREA SHALL:
1.ILLUMINATE "ALARM/DISCHARGE" INDICATOR ON THE CONTROL PANEL.
2.FM200CP energizes Alarm Bell inside protected areas.
3.Give visual indication on annunciator panel.
4.FAS500CP transmits "ALARM" signal to BMS system.
5.FAS350CP transmits "ALARM" signal to FAS system.
6.FM200CP transmits signal to MTV actuators to close all MFDs related the protected / released the protected room.
7.Releases and close doors in protected area.

B) SUBSEQUENT OPERATION OF A CROSS-ZONED DETECTOR WITHIN THE PROTECTED AREA SHALL:
1.ILLUMINATE "PRE-DISCHARGE" INDICATOR ON THE CONTROL PANEL.
2.FM200CP energize Horn/Strobe Device outside protected areas.
3.Give visual indication on annunciator panel.
4.ACTUATE CIRCUIT TO ENERGIZE (-30 SECOND ADJUSTABLE EVACUATION TIMER.
5.ENABLE SYSTEM ABORT SEQUENCE.
6.AHU, FAN will be shut down via FAS through MCC panel based on "ALARM" sent by FM200CP.
7.To Civil Aide Contractors (For FM200 rooms only): FM200CP transmits signal to Civil aide contractors control box to open all top windows.

C) AFTER PRE-SET TIME DELAY SEQUENCE, THE FOLLOWING SHALL OCCUR:
1.Solenoid valve ("ASSEMBLY energizes solenoid valve to release FM200 into the protected area.
2.ILLUMINATE "RELEASE" INDICATOR ON THE CONTROL PANEL.
3.To FAS: FM200CP transmits "GAS RELEASED" signal to FAS system.

**MANUAL OPERATION**

* Operating manual-release stations will discharge extinguishing agent when activated SEQUENCE DESCRIBED ABOVE EXCEPT TIME DELAY AND ABORT FUNCTIONS. TIME DELAY CAN BE PROGRAMMED IF REQUIRED.

**ABORT OPERATION**

* IF ABORT SWITCH IS ACTIVATED WITHIN PRE-DISCHARGE PERIOD, THE FOLLOWING SHALL OCCUR:
1.ILLUMINATE "ABORT" INDICATOR ON THE CONTROL PANEL.
2.RELEASE OF GAS WILL DELAY EXTINGUISHING AGENT DISCHARGE IF ABORT SWITCH IS PRESSED CONTINUOUSLY.
3.AGENT WILL RELEASE IF ABORT SWITCH IS RELEASED AND COUNTDOWN IS COMPLETED.

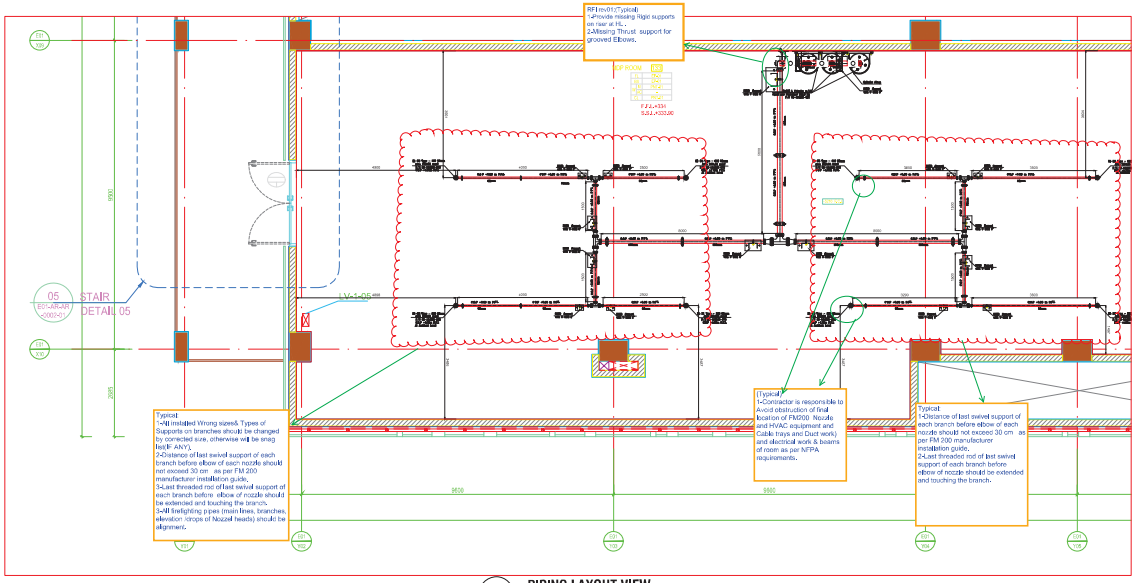
**BLOW AGENT PRESSURE SWITCH**

- 1.Initiate trouble alarm if sensing less than set pressure.
- 2.ILLUMINATE "SUP" INDICATOR ON THE CONTROL PANEL.

MDB 133 ROOM FM200/CYL.= 3x 300,00 KG PART 4

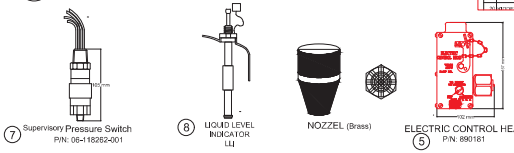
| nozzle | type | nozzle DIA | part number |
|---|---|---|---|
| E1-N1 | 360° | 50 mm | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 90-194028-578 |

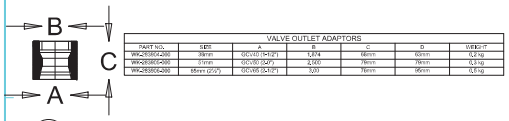
| S/NO. | | QTY | MODEL NO. |
|---|---|---|---|
| 1 | MAIN CYLINDER WITH CYLINDER VALVE & LLI | 5 PCS | 90-199995-001 |
| 2 | CYLINDER STRAP | 5 PCS | |
| 3 | ELECTRICAL CONTROL HEAD | 1 PCS | 90-890181-000 |
| 4 | SUPERVISORY PRESSURE SWITCH | 5 PCS | 06-118360-001 |
| 5 | FIRE SUPPRESSION CONTROL PANEL | 1 PCS | AR855 2U |
| 6 | MULTI TONE HORN / STROBE | 1 PCS | 1935-A |
| 7 | MANUAL PULL STATION | 1 PCS | 84-230002-001 |
| 8 | ABORT SWITCH | 1 PCS | 84-278753-010 |
| 9 | PHOTO SMOKE DETECTOR | 46 PCS | DS-PS |
| 10 | HEAT DETECTOR | 46 PCS | DS-HFS |
| 11 | ALARM BELL 6 " | 1 PCS | 5630-6-24 |
| 12 | PRESSURE OPERATED HEAD | 2 PCS | 84-278753-000 |
| 13 | Swing Check Valve 3" | 3 PCS | 06-118358-001 |
| 14 | Actuation hose 3 " | 2 PCS | WK-298389-000 |
| 15 | Male Elbow 4" - Rp/ex x 1/8" NPT | 2 PCS | WK-299230-000 |
| 16 | Male Connector 4" - Rp/ex x 1/8" NPT | 2 PCS | WK-299233-010 |
| 17 | NODE ASM MODULE | 2 PCS | 10-260390-003 |
| 18 | NODE AO RELAY MODULE | 0 PCS | 10-460004-001 |
| 19 | NODE AI MONITOR MODULE | 7 PCS | 10-417008-001 |
| 20 | NODE SIGNAL ADDRESSABLE MODULE | 1 PCS | 10-260000-003 |


RFI rev01(Typical)
1-Provide missing Rigid supports on riser at HL.
2-Missing Thrust support for grooved Elbows.
STAIR DETAIL 05
Typical
1-All installed Wrong sized& Types of Supports on branches should be changed by corrected size, otherwise will be snag list(IF ANY).
2-Distance of last swivel support of each branch before elbow of each nozzle should not exceed 30 cm as per FM 200 manufacturer installation guide,
3-Last threaded rod of last swivel support of each branch before elbow of nozzle should be extended and touching the branch.
4-All firefighting pipes (main lines, branches, elevation /drops of Nozzel heads) should be alignment.
(Typical)
1-Contractor is responsible to Avoid obstruction of final location of FM200 Nozzle and HVAC equipment and Cable trays and Duct work) and electrical work & beams of room as per NFPA requirements.
Typical
1-Distance of last swivel support of each branch before elbow of each nozzle should not exceed 30 cm as per FM 200 manufacturer installation guide,
2-Last threaded rod of last swivel support of each branch before elbow of nozzle should be extended and touching the branch.

## PIPING LAYOUT VIEW
Scale 1:100

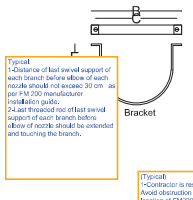
## GENERAL COMPONENTS DETAILS
N.T.S




VALVE OUTLET ADAPTORS

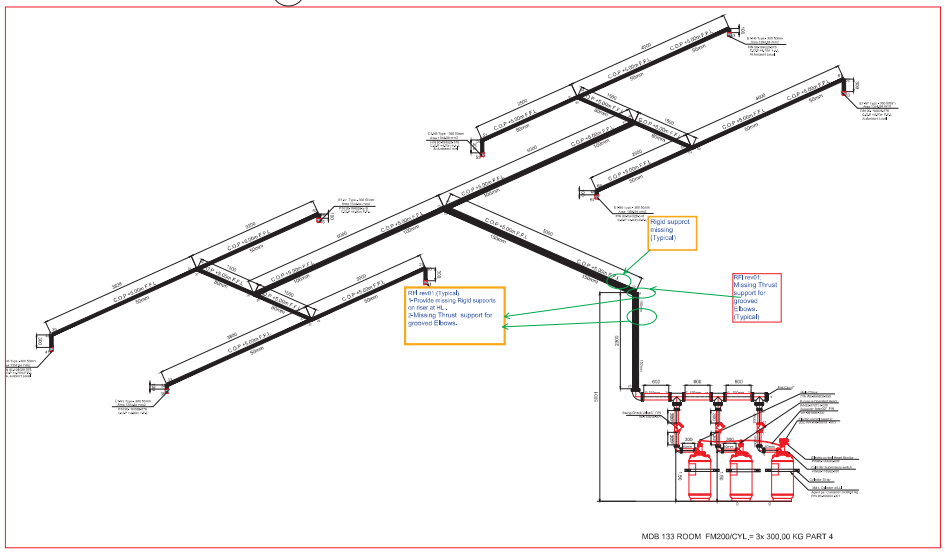
| PART NO. | SIZE | A | B | C | D | WEIGHT |
|---|---|---|---|---|---|---|
| WK-260004-000 | 25mm | 60(1") | 1,474 | 56mm | 92mm | 0,2 kg |
| WK-260005-000 | 51mm | 60(1") | 2,000 | 76mm | 76mm | 0,3 kg |
| WK-260006-000 | 65mm (2½") | 60(1½") | 3,00 | 76mm | 95mm | 0,6 kg |



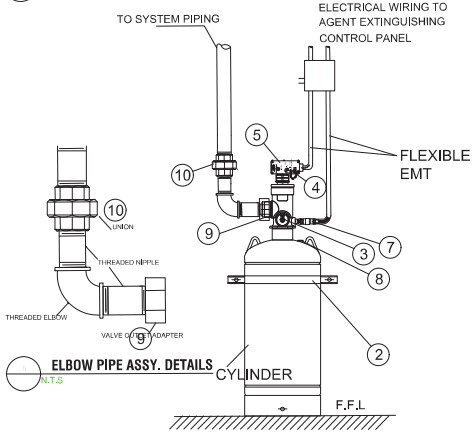

Typical
1-Distance of last swivel support of each branch before elbow of each nozzle should not exceed 30 cm as per FM 200 manufacturer installation guide,
2-Last threaded rod of last swivel support of each branch before elbow of nozzle should be extended and touching the branch.

(Typical)
1-Contractor is responsible to Avoid obstruction of final location of FM200 Nozzle and HVAC equipment and Cable trays and Duct work) and electrical work & beams of room as per NFPA requirements.

Typical
1-For Nozzle placement: Follow Manufacturer installation Guide manual rules for clarification and nozzles installation and the Coverage and height limitations per each nozzle to ensure proper agent distribution.


RH rev01 (Typical)
1-Provide missing Rigid supports on riser at HL.
2-Missing Thrust support for grooved Elbows.
Rigid support missing (Typical)
RH rev01 Missing Thrust Support for grooved Elbows. (Typical)
MDB 133 ROOM FM200/CYL.= 3x 300,00 KG PART 4

## MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS
N.T.S




## ELBOW PIPE ASSY. DETAILS
N.T.S

Typical
1-All installed Wrong sized& Types of Supports on branches should be changed by corrected size, otherwise will be snag list(IF ANY).
2-Distance of last swivel support of each branch before elbow of each nozzle should not exceed 30 cm as per FM 200 manufacturer installation guide,
3-Last threaded rod of last swivel support of each branch before elbow of nozzle should be extended and touching the branch.
4-All firefighting pipes (main lines, branches, elevation /drops of Nozzel heads) should be alignment.

| SN | |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | MANUAL LEVER |
| 5 | ELECTRIC CONTROL HEAD |
| 6 | PRESS. SWITCH |
| 7 | SUPERVISORY PRESS. SWITCH |
| 8 | LIQUID LEVEL INDICATOR |
| 9 | OUTLET VALVE ADAPTOR |
| 10 | UNION |
| 11 | MAINTENANCE SWITCH |
| 12 | JUNCTION BOX |
| 13 | FLEXIBLE EMT |

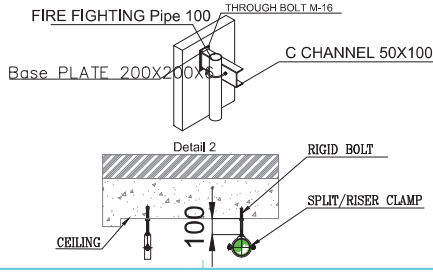
Typical
1-All white Teflon shall be painted with final paint 2-All exposed Linen and Teflon from threaded fittings should be trimmed and cut
3-All the bad pipes primer paint must be repaired and painted before the final layer of red

## HANGER SPACING DETAILS AS PER ANSI B31.1&MSS SP-58

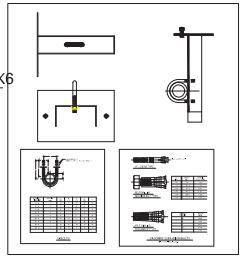
| | R SPACING M (ft) |
|---|---|
| 15 (1/2") | 2.4 (8ft) |
| 20 (3/4") | 2.7 (9ft) |
| 25 (1") | 2.7 (9ft) |
| 32 (1 1/4") | 2.7 (9ft) |
| 40 (1 1/2") | 3.7 (12ft) |
| 50 (2") | 4 (13ft) |
| 65 (2 1/2") | 4.3 (14ft) |
| 80 (3") | 4.6 (15ft) |
| 100 (4") | 5.2 (17ft) |

## Pipe Support Detalis
N.T.S

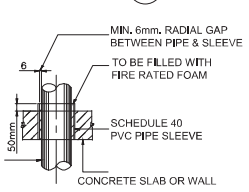
Detail 1 RIGID SUPPORT




Detail 1 RIGID SUPPORT



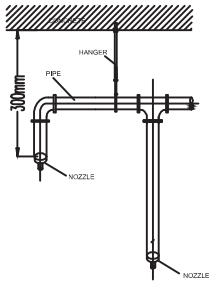
## ISOMETRIC VIEW
NTS


MIN. 6mm. RADIAL GAP BETWEEN PIPE & SLEEVE
6
TO BE FILLED WITH FIRE RATED FOAM
SCHEDULE 40 PVC PIPE SLEEVE
50mm
CONCRETE SLAB OR WALL

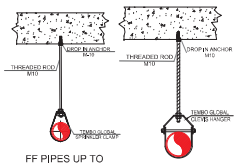
PIPE SLEEVE SCHEDULE:

| PIPE SIZE IN MM | SELLVE SIZE IN MM |
|---|---|
| 65 | 100 |
| 100 | 150 |

PIPE SLEEVE GENERAL




Detail 2




Client:
Ministry of Housing, Utilities & Urban Development
New Urban Communities Authority

Main Consultant:
dar Dar Al-Handasah (Shair)

Sub-Consultant:
SHAKER CONSULTING GROUP

Contractor:

Project Name:
Central Business District Of the New Administrative Capital
CBD EAST - PHASE 1

Key Plan:
NORTH

Sub Contractor:
Mechanical Engineering Service & Consulting
mesc

NOTES / LEGEND:

| Legend | Symbol |
|---|---|
| FIRE FIGHTING AND ALARM/CONTROL PANEL Model AR855 | F.F.C.P |
| ADDRESSABLE SMOKE DETECTOR Model DS-PS | |
| ADDRESSABLE HEAT DETECTOR Model DS-HFS | |
| FIRE BELL Model MBA-6-24 | |
| STROBE WITH FLASHER Model SBR-A | SF |
| GAS ABORT Model Elder STOTE | A |
| MANUAL RELEASE Elder 5000 | M |
| FM200 CYLINDER | |
| Valve Outlet Adapter 2.5" P/N WK-260005-000 | |
| Cylinder Supervisory switch P/N06-118360-001 | |
| Electric control Head 24 VDC P/NWK-890181-000 | |
| Electric control Head Monitor P/NWK-100000-000 | |
| FM200 Nozzle | |
| NODE SIGNALING MODULE ADR P/N 70-000000-001 | |
| NODE OUTPUT RELAY MODULE AO P/N 70-400004-001 | |
| NODE INPUT MONITOR MODULE AI P/N 70-417008-001 | AI |
| NODE OUTPUT SIGNAL MODULE ASM P/N 70-000000-000 | |

Revision Table:

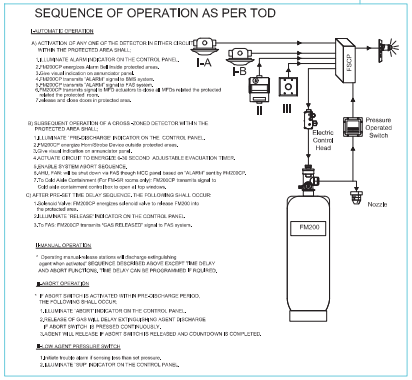
| No. | Description | Date | App. |
|---|---|---|---|
| 05 | FOR APPROVAL | 14 MAY 2022 | ETHAN. |

Drawing Title:
CUC-E01 UTILITY BUILDING
FIRST FLOOR
MBD ROOM 1-133
FM200 SUPPRESSION SYSTEM

| Designed | Checked | Approved |
|---|---|---|
| GHANY | GHANY | ETHAN |
| Drawn | Date | Scale |
| AJARO ALLAM | 17 MAY 2022 | 1:100 |

| Type | Contractor | Profile No. | Profile Type | Discip. | Sub Discip. | Plant Type | Plant Level | Part No. | Sheet No. | Sequence No. | Rev. No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SHD | CSCEC | 17 | E01 | ME | FF | 04 | 01 | 01 | 0001 | 0002 | 01 |

## SEQUENCE OF OPERATION AS PER TOD




I-AUTOMATIC OPERATION

A) ACTIVATION OF ANY ONE OF THE DETECTOR IN EITHER CIRCUIT WITHIN THE PROTECTED AREA SHALL:
1-ILLUMINATE ALARM INDICATION ON THE CONTROL PANEL.
2-FM200CP energizes Alarm Bell inside protected areas.
3-Give visual indication on annunciator panel.
4-FM200CP transmits "ALARM" signal to BMS system.
5-FM200CP transmits "ALARM" signal to PAS system.
6-FM200CP transmits signals to MFD actuators to close all MFDs related the protected / related the protected areas.
7-Release and close doors in protected area.

B) SUBSEQUENT OPERATION OF A CROSS-ZONED DETECTOR WITHIN THE PROTECTED AREA SHALL:
1-ILLUMINATE "PRE-DISCHARGE" INDICATION ON THE CONTROL PANEL.
2-FM200CP energizes thro'-Entire Electro-actuate protected areas.
3-Give visual indication on annunciator panel.
4-ACTIVATE CIRCUIT TO EXTINGUISH GAS SECOND ADJUSTABLE EVACUATION TIMER.
5-INHIBIT SYSTEM ABORT SEQUENCE.
6-PRE PAS will be shut down via PAS through MCC panel based on "ALARM" sent by FM200CP.
7-To Gas Area Containment (For FM-01 room only) FM200CP transmits signal to Cell-side containment control room to open all fire windows.

C) AFTER PRE-SET TIME DELAY SEQUENCES, THE FOLLOWING SHALL OCCUR
1-Activate Valve FM200CP energizes solenoid valve to release FM200 into the protected area.
2-ILLUMINATE "RELEASE" INDICATION ON THE CONTROL PANEL.
3-To PAS: FM200CP transmits "GAS RELEASED" signal to PAS system.

II-MANUAL OPERATION

* Operating manual-release stations will discharge extinguishing agent when activated SEQUENCE DESCRIBED ABOVE EXCEPT TIME DELAY AND ABORT FUNCTIONS, TIME DELAY CAN BE PROGRAMMED IF REQUIRED.

III-ABORT OPERATION

* IF ABORT SWITCH IS ACTIVATED WITHIN PRE-DISCHARGE PERIOD, THE FOLLOWING SHALL OCCUR
1-ILLUMINATE "ABORT" INDICATION ON THE CONTROL PANEL.
2-RELEASE OF GAS WILL DELAY EXTINGUISHING AGENT DISCHARGE
IF ABORT SWITCH IS PRESSED CONTINUOUSLY.
3-AGENT WILL RELEASE IF ABORT SWITCH IS RELEASED AND COUNTDOWN IS COMPLETED.

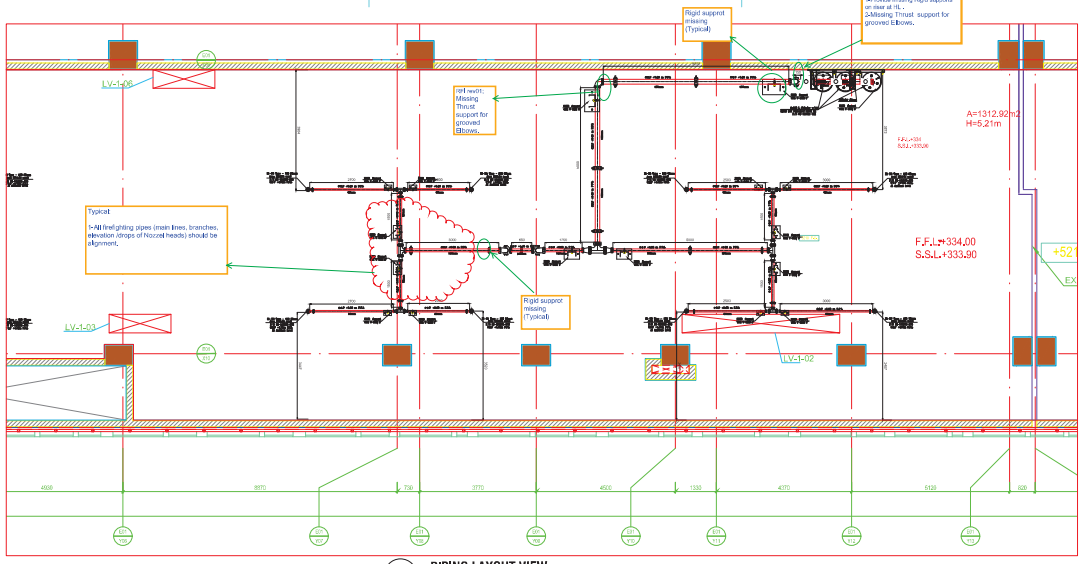
IV-ON AGENT PRESSURE SWITCH

Update trouble alarm if sensing lines think set pressure.
ILLUMINATE "DISP" INDICATION ON THE CONTROL PANEL.

## MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 3

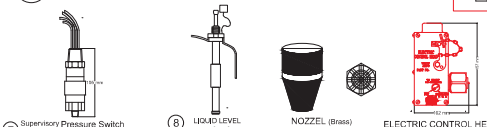
| nozzle | type | nozzle DIA | part number |
|---|---|---|---|
| E1-N1 | 360° | 50 mm | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 90-194028-578 |

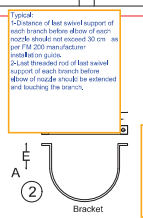
| QAS | | QTY | MODEL NO. |
|---|---|---|---|
| 1 | 4x8N CYLINDER WITH CYLINDER VALVE & LI | 3 | PCS 90-194061-131 |
| 2 | CYLINDER STRAP | 1 | PCS |
| 3 | ELECTRICAL CONTROL HEAD | 1 | PCS 90-195115-200 |
| 4 | SUPERVISORY PRESSURE SWITCH | 1 | PCS 90-195362-01 |
| 5 | FIRE SUPPRESSION CONTROL PANEL | 1 | PCS AFES-220 |
| 6 | WALL TONE HORN / STROBE | 1 | PCS HSP-A |
| 7 | MANUAL PULL STATION | 1 | PCS 90-200030-001 |
| 8 | ABORT SWITCH | 1 | PCS 90-200150-000 |
| 9 | PHOTO SMOKE DETECTOR | 44 | PCS DS-70 |
| 10 | HEAT DETECTOR | 44 | PCS DS-PFS |
| 11 | ALARM BELL 6 " | 1 | PCS MB-6-24 |
| 12 | PRESSURE OPERATED HEAD | 2 | PCS 02-2/3737-200 |
| 13 | Swing Check Valve 3" | 3 | PCS 90-195362-231 |
| 14 | Actuator Model 3 " | 3 | PCS 90-194028-003 |
| 15 | Male Elbow ⊕ " Bore x 1/8" NPT | 2 | PCS WK-200056-039 |
| 16 | Male Connector ⊕ " Bore x 1/8" NPT | 2 | PCS WK-200074-013 |
| 17 | 4DGS ASM MODULE | 2 | PCS 90-200030-003 |
| 18 | 4DGS AC RELAY MODULE | 3 | PCS 90-195004-001 |
| 19 | 4DGS AI MONITOR MODULE | 1 | PCS 90-197005-001 |
| 20 | 4DGS MAN RELEASING MODULE | 1 | PCS 90-200030-001 |
| 21 | | | |




### PIPING LAYOUT VIEW
Scale 1:100

### GENERAL COMPONENTS DETAILS
N.T.S


7 Supervisory Pressure Switch P/N: 06-118260-001
8 LIQUID LEVEL INDICATOR LLI
NOZZEL (Brass)
5 ELECTRIC CONTROL HEAD P/N: 890181

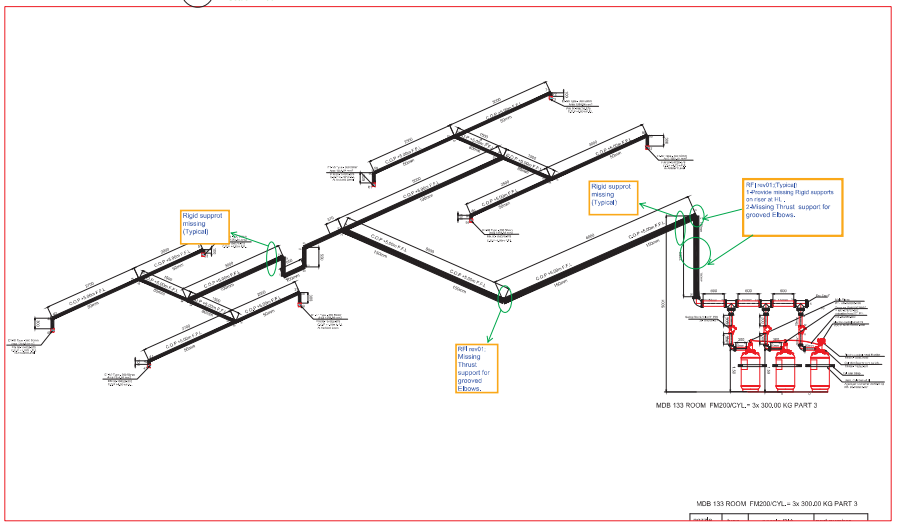

Typical:
1-Distance of last swivel support of each branch before elbow of each nozzle should not exceed 30 cm as per FM 200 manufacturer installation guide.
2-Last threaded rod of last swivel support of each branch before elbow of nozzle should be extended and touching the branch.
L
E
A
2
Bracket

(Typical)
1-Contractor is responsible to Avoid obstruction of final location of FM200 Nozzle and HVAC equipment and Cable trays and Duct work) and electrical work & beams of room as per NFPA requirements.

Typical:
1-For Nozzle placement: Follow Manufacturer installation Guide manual rules for obstruction and nozzles installation and the Coverage and height limitations per each nozzle to ensure proper agent distribution.

Typical:
1-All installed Wrong sizes& Types of Supports on branches should be changed by corrected size, otherwise will be snag list(F ANY).
2-Distance of last swivel support of each branch before elbow of each nozzle should not exceed 30 cm as per FM 200 manufacturer installation guide.
3-Last threaded rod of last swivel support of each branch before elbow of nozzle should be extended and touching the branch.
4-All firefighting pipes (main lines, branches, elevation /drops of Nozzel heads) should be alignment.

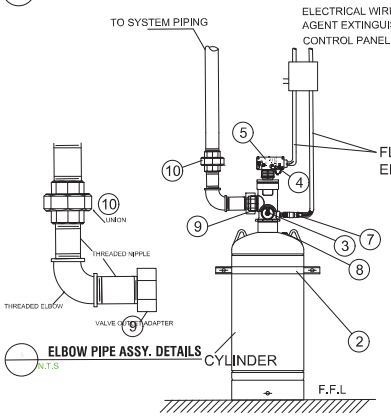
(Typical)
1-All white Teflon shall be painted with final paint
2-All exposed Linen and Teflon from threaded fittings should be trimmed and cut
3-All the bad pipes primer paint must be repaired and painted before the final layer of red


Rigid support missing (Typical)
Rigid support missing (Typical)
RFI rev01: (Typical)
1-Provide missing Rigid supports on riser at HL .
2-Missing Thrust support for grooved Elbows.
RFI rev01: Missing Thrust support for grooved Elbows.
MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 3

### VALVE OUTLET ADAPTORS

| PART NO. | SIZE | A | B | C | D | WEIGHT |
|---|---|---|---|---|---|---|
| WK-450056-039 | 3Bore | GCV90 (3-1/2") | 1,200 | 89mm | 82mm | 0.2 kg |
| WK-450055-039 | 2.5 mm | GCV90 (3-1/2") | 1,200 | 79mm | 70mm | 0.3 kg |
| WK-450053-039 | 80mm (3-1/2") | GCV90 (3-1/2") | 1,00 | 76mm | 68mm | 0.3 kg |

### MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS
N.T.S



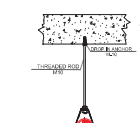

### MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS

| SN | DESCRIPTION |
|---|---|
| 1 | CYLINDER |
| 2 | BRACKET |
| 3 | CYLINDER VALVE |
| 4 | MANUAL LEVER |
| 5 | ELECTRIC CONTROL HEAD |
| 6 | PRESS. SWITCH |
| 7 | SUPERVISORY PRESS. SWITCH |
| 8 | LIQUID LEVEL INDICATOR |
| 9 | OUTLET VALVE ADAPTOR |
| 10 | UNION |
| 11 | MAINTENANCE SWITCH |
| 12 | JUNCTION BOX |
| 13 | FLEXIBLE EMT |

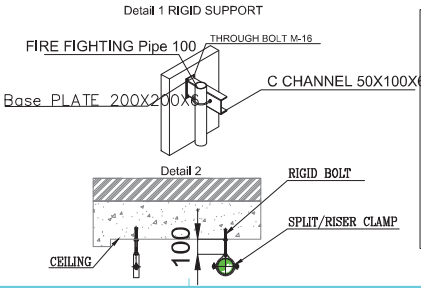
### HANGER SPACING DETAILS AS PER ANSI B31.1&MSS SP-58

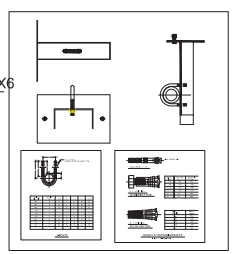
| PIPE SIZE mm (in) | HANGER SPACING M (ft) |
|---|---|
| 15 (1/2") | 2,4 (8ft) |
| 20 (3/4") | 2.7 (9ft) |
| 25 (1") | 2.7 (9ft) |
| 32 (1 1/4") | 2.7 (9ft) |
| 40 (1 1/2") | 3,7 (12ft) |
| 50 (2") | 4 (13ft) |
| 65 (2 1/2") | 4.3 (14ft) |
| 80 (3") | 4.6 (15ft) |
| 100 (4") | 5.2 (17ft) |

### ELBOW PIPE ASSY. DETAILS
N.T.S

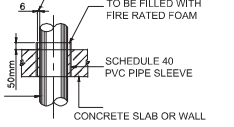



### Pipe Support Details
N.T.S



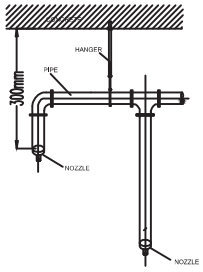

### ISOMETRIC VIEW
NTS


MIN. 6mm. RADIAL GAP BETWEEN PIPE & SLEEVE
6
TO BE FILLED WITH FIRE RATED FOAM
50mm
SCHEDULE 40 PVC PIPE SLEEVE
CONCRETE SLAB OR WALL

PIPE SLEEVE SCHEDULE:

| PIPE SIZE IN MM | SELLVE SIZE IN MM |
|---|---|
| 65 | 100 |
| 100 | 150 |

PIPE SLEEVE GENERAL




Client:
Ministry of Housing, Utilities & Urban Development
New Urban Communities Authority

Main Consultant:
dar

Sub-Consultant:
SHAKER

Contractor:

Project Name:
Central Business District Of the New Administrative Capital
CBD EAST • PHASE 1

Key Plan:
NORTH

Sub Contractor:
Mechanical Engineering Service & Consulting
mesc

NOTES / LEGEND:

| Legend | Symbol |
|---|---|
| FIRE FIGHTING AND ALARM CONTROL PANEL MODEL AFESP | F.F.C.P |
| ADDRESSABLE SMOKE DETECTOR Model DS-PF | |
| ADDRESSABLE HEAT DETECTOR Model DS-HPF | |
| FIRE BELL Model MBA-6-24 | |
| STROBE WITH PLAQUE Model HSP-A | SF |
| GAS ASSET Model Kidde 878782 | A |
| MANUAL RELEASE Kidde 2000 | M |
| FM200 CYLINDER | |
| Valve Outlet Adapter 3.5" P/N WK-200056-039 | |
| Cylinder Supervisory switch P/N90-118260-001 | |
| Electric control Head 24 VDC P/N90-890181-000 | |
| Electric control Head Number P/N90-118000-000 | |
| FM200 Nozzle | |
| 4DGS RELEASING MODULE ASM P/N 90-400000-001 | |
| 4DGS OUTPUT RELAY MODULE AS P/N 90-400004-000 | |
| 4DGS INPUT MONITOR MODULE AI P/N 90-417000-001 | |
| 4DGS OUTPUT SIGNAL MODULE ASM P/N 90-200030-000 | |

Revision Table:

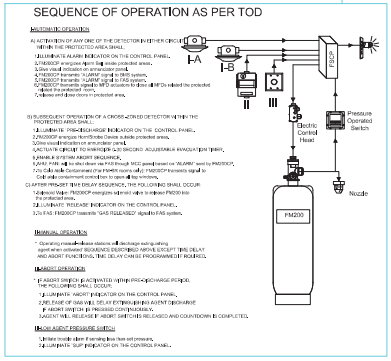
| No. | Description | Date | App. |
|---|---|---|---|
| 00 | FOR APPROVAL | 14 MAY 2022 | ETI-MK |

Drawing Title:
CUC-E01 UTILITY BUILDING
FIRST FLOOR
MBD ROOM 1-133
FM200 SUPPRESSION SYSTEM

| Designed | Checked | Approved |
|---|---|---|
| GHNV | GHNV | ETMH |
| Drawn | Date | Scale |
| AJIRO ALLAN | 17 MAY 2022 | 1:100 |

| SHO | CSCEC | 17 | E01 | ME | FF | 04 | 01 | 01 | 0001 | 0002 | 01 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Contractor | Tender No. | Building No. | Discipline | Sub Discipline | Plan Type | Level No. | Sheet No. | Sequence No. | Rev. No. |

## SEQUENCE OF OPERATION AS PER TOD

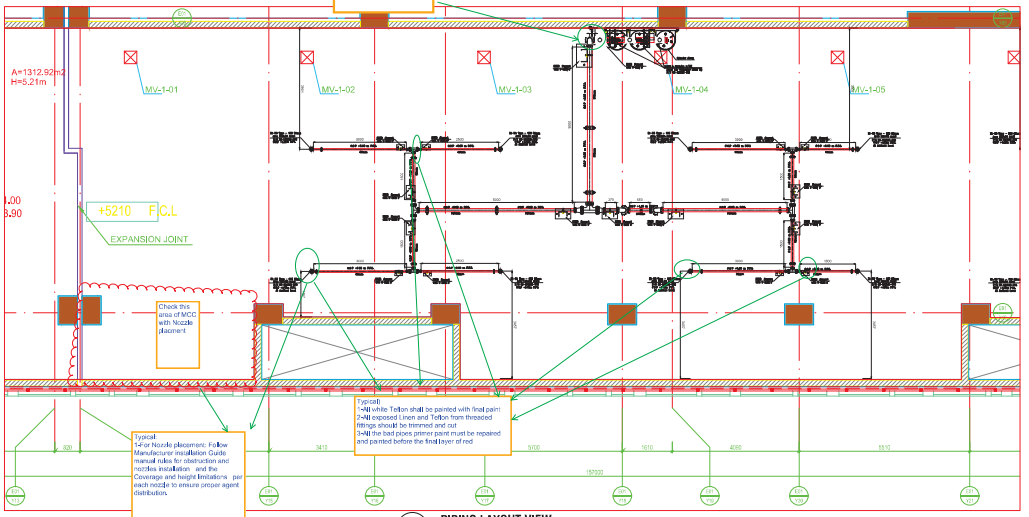



MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 2

| nozzle | type | nozzle DIA | part number |
|---|---|---|---|
| E1-N1 | 360° | 50 mm | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 90-194028-578 |

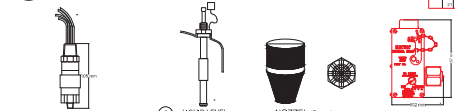
| SN | | QTY | MODEL NO. |
|---|---|---|---|
| 1 | MAIN CYLINDER WITH CYLINDER VALVE & LLI | 3 PCS | 90-193091-001 |
| 2 | CYLINDER STRAP | 3 PCS | |
| 3 | ELECTRICAL CONTROL HEAD | 1 PCS | 90-193019-001 |
| 4 | SUPERVISORY PRESSURE SWITCH | 3 PCS | 90-193021-001 |
| 5 | FIRE SUPPRESSION CONTROL PANEL | 1 PCS | AMEC 2.0 |
| 6 | MULTI TONE HORN / STROBE | 1 PCS | MHS-A |
| 7 | MANUAL PULL STATION | 1 PCS | 90-193033-001 |
| 8 | ABORT SWITCH | 1 PCS | 90-193019-001 |
| 9 | PHOTO SMOKE DETECTOR | 48 PCS | 2351-9 |
| 10 | HEAT DETECTOR | 48 PCS | 2351-HTS |
| 11 | ALARM BELL 6" | 1 PCS | MH-6-24 |
| 12 | PRESSURE OPERATED HEAD | 3 PCS | 90-193072-001 |
| 13 | Swing Check Valve 3" | 3 PCS | 90-193091-001 |
| 14 | Actuation hose 3 " | 3 PCS | WA-2045S-000 |
| 15 | Male Elbow 6" Type x 1/8" NPT | 3 PCS | WA-4060S-000 |
| 16 | Male Connector 4"-7 Type x 1/8" NPT | 3 PCS | WA-4060S-010 |
| 17 | DECODE ARM MODULE | 1 PCS | 10-193033-001 |
| 18 | DECODE AC RELAY MODULE | 1 PCS | 10-193034-001 |
| 19 | DECODE ARMATOR MODULE | 1 PCS | 10-193035-001 |
| 20 | DOOR RBR RELEASING MODULE | 1 PCS | 10-193036-001 |

RFI rev01 (Typical)
1-Provide missing Rigid supports on riser at HL.
2-Missing Thrust support for grooved Elbows.


A=1312.92m2
H=5.21m
MV-1-01
MV-1-02
MV-1-03
MV-1-04
MV-1-05
+5210 F.C.L
EXPANSION JOINT
Check this area of MCC with Nozzle placment
Typical:
1-For Nozzle placement: Follow Manufacturer installation Guide manual rules for obstruction and nozzles installation and the Coverage and height limitations per each nozzle to ensure proper agent distribution.
Typical:
1-All white Teflon shall be painted with final paint
2-All exposed Linen and Teflon from threaded fittings should be trimmed and cut
3-All the bad pipes primer paint must be repaired and painted before the final layer of red

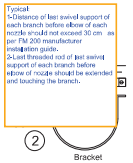
### PIPING LAYOUT VIEW
Scale: 1:100

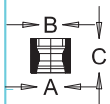
## GENERAL COMPONENTS DETAILS
N.T.S




Typical:
1-For Nozzle placement: Follow Manufacturer installation Guide manual rules for obstruction and nozzles installation and the Coverage and height limitations per each nozzle to ensure proper agent distribution.

Typical:
1-Distance of last swivel support of each branch before elbow of each nozzle should not exceed 30 cm as per FM 200 manufacturer installation guide.
2-Last threaded rod of last swivel support of each branch before elbow of nozzle should be extended and touching the branch.



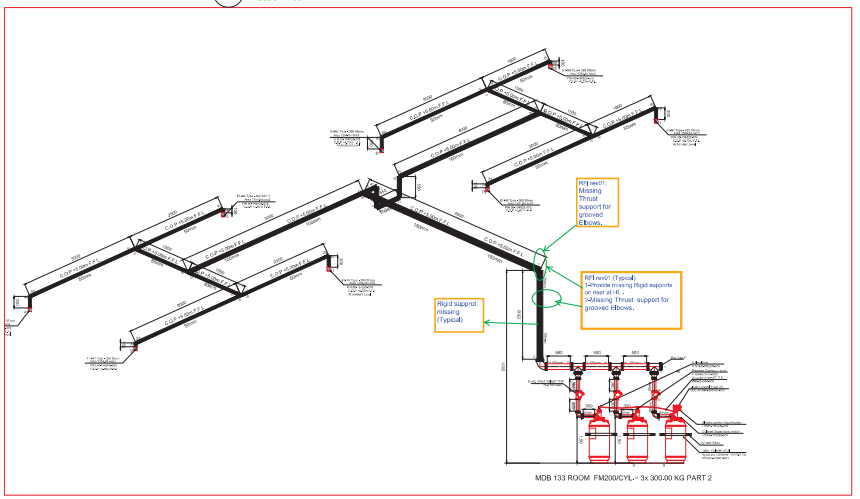




| VALVE OUTLET ADAPTORS | | | | | | | |
|---|---|---|---|---|---|---|---|
| PART NO. | size | A | B | C | D | | |
| 90-193096-000 | 25mm | 60/65 (1-1/2") | 1.2/4 | 98mm | 63mm | | |
| 90-193096-001 | 51mm | 60/65 (2x2") | 0.4/8 | 74mm | 76mm | 0.3 kg | |
| 90-193096-002 | 63mm (2x3") | 60/65 (2-1/2") | 3.30 | 74mm | 90mm | 0.3 kg | |

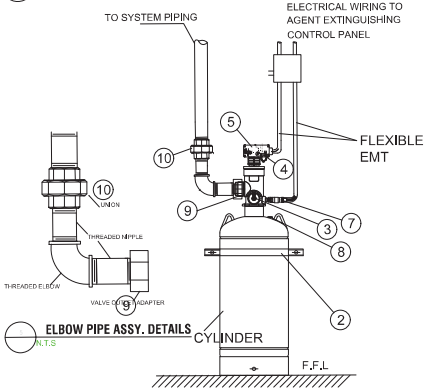
Typical:
1-All installed Wrong sizes& Types of Supports on branches should be charged by corrected sizes, otherwise we'll be snag list(IF ANY).
2-Distance of last swivel support of each branch before elbow of each nozzle should not exceed 30 cm as per FM 200 manufacturer installation guide.
3-Last threaded rod of last swivel support of each branch before elbow of nozzle should be extended and touching the branch.
3-All firefighting pipes (main lines, branches, elevation (drops of Nozzel heads) should be alignment.

(Typical)
1-Contractor is responsible to Avoid obstruction of final location of FM200 Nozzle and HVAC equipment and Cable trays and Duct work) and electrical work & beams of room as per NFPA requirements.

Typical:
1-All white Teflon shall be painted with final paint
2-All exposed Linen and Teflon from threaded fittings should be trimmed and cut
3-All the bad pipes primer paint must be repaired and painted before the final layer of red


RFI rev01: Missing Thrust support for grooved Elbows.
RFI rev01 (Typical)
1-Provide missing Rigid supports on riser at HL.
2-Missing Thrust support for grooved Elbows.
Rigid support missing (Typical)
MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 2

## MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS
N.T.S



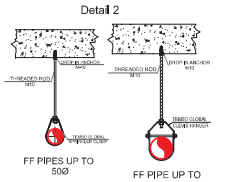

### MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS

| SN | DESCRIPTION |
|---|---|
| 1 | CYLINDER |
| 2 | BRACKET |
| 3 | CYLINDER VALVE |
| 4 | MANUAL LEVER |
| 5 | ELECTRIC CONTROL HEAD |
| 6 | PRESS. SWITCH |
| 7 | SUPERVISORY PRESS. SWITCH |
| 8 | LIQUID LEVEL INDICATOR |
| 9 | OUTLET VALVE ADAPTOR |
| 10 | UNION |
| 11 | MAINTENANCE SWITCH |
| 12 | JUNCTION BOX |
| 13 | FLEXIBLE EMT |

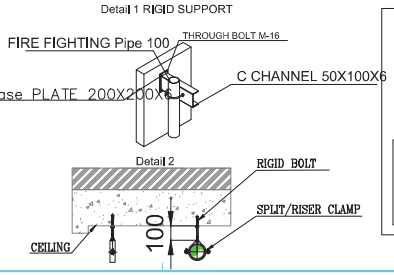
### HANGER SPACING DETAILS AS PER ANSI B31.1&MSS SP-58

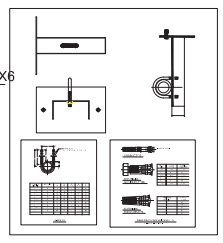
| PIPE SIZE HANGER SPACING mm (in) | M (ft) |
|---|---|
| 15 (1/2") | 2.4 (8ft) |
| 20 (3/4") | 2.7 (9ft) |
| 25 (1") | 2.7 (9ft) |
| 32 (1 1/4") | 2.7 (9ft) |
| 40 (1 1/2") | 3.7 (12ft) |
| 50 (2") | 4 (13ft) |
| 65 (2 1/2") | 4.3 (14ft) |
| 80 (3") | 4.6 (15ft) |
| 100 (4") | 5.2 (17ft) |

## ELBOW PIPE ASSY. DETAILS
N.T.S

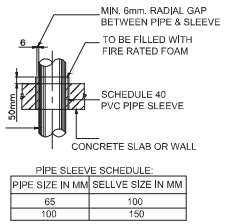



## Pipe Support Details
N.T.S



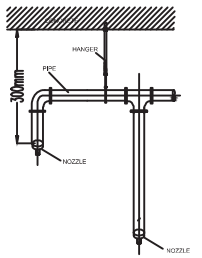

## ISOMETRIC VIEW
NTS


MIN. 6mm. RADIAL GAP BETWEEN PIPE & SLEEVE
TO BE FILLED WITH FIRE RATED FOAM
SCHEDULE 40 PVC PIPE SLEEVE
CONCRETE SLAB OR WALL
6
50mm

PIPE SLEEVE SCHEDULE:

| PIPE SIZE IN MM | SELLVE SIZE IN MM |
|---|---|
| 65 | 100 |
| 100 | 150 |

PIPE SLEEVE GENERAL




Client:
Ministry of Housing, Utilities & Urban Development
New Urban Communities Authority

Main Consultant:
dar

Sub-Consultant:
SHAKER

Contractor:

Project Name:
Central Business District Of the New Administrative Capital
CBD EAST • PHASE 1

Key Plan:
NORTH

Sub Contractor:
Mechanical Engineering Service & Consulting
mesc

NOTES / LEGEND:

| Legend | Symbol |
|---|---|
| FIRE FIGHTING AND ALARM/CONTROL PANEL Model AMEC | F.F.C.P |
| ADDRESSABLE SMOKE DETECTOR Model DP-PH | |
| ADDRESSABLE HEAT DETECTOR Model DP-HTS | |
| FIRE BELL Model MH-6-24 | |
| STROBE WITH PLAQUES Model MHS-A | ST |
| Cut SHUT Model Kidde 070982 | A |
| MANUAL RELEASE Kidde 2000 | M |
| FM200 CYLINDER | |
| Valve Outlet Adapter 90° P/N 90-193096-000 | |
| Cylinder Supervisory switch P/N90-193021-001 | |
| Electric control Head 24 VDC P/N90-193019-001 | |
| Electric control Head Heater P/N90-193020-000 | |
| FM200 Nozzle | |
| ZONE RELEASING MODULE RRM P/N 10-400000-001 | |
| ZONE OUTPUT RELAY MODULE AO P/N 10-400004-001 | |
| ZONE INPUT MONITOR MODULE AI P/N 10-400005-001 | |
| ZONE OUTPUT SIGNAL MODULE AOM P/N 10-400006-001 | |

Revision Table:

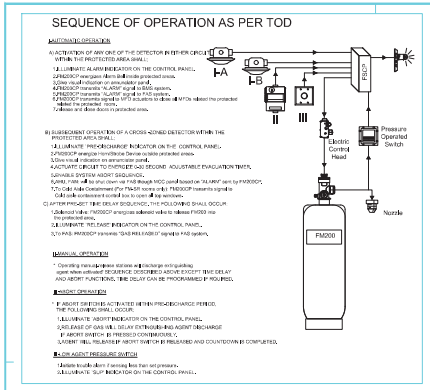
| No. | Description | Date | App. |
|---|---|---|---|
| 00 | FOR APPROVAL | 14 MAY 2022 | ETHAN |

Drawing Title:
CUC-E01 UTILITY BUILDING
FIRST FLOOR
MBD ROOM 1-133
FM200 SUPPRESSION SYSTEM

| Designed | Checked | Approved |
|---|---|---|
| GRANT | OMAR | ETHAN |
| Drawn | Date | Scale |
| AJAO ALAA | 17 MAY 2022 | 1:100 |

| SHO | CSCEC | 17 | E01 | ME | FF | 04 | 01 | 01 | 0001 | 0002 | 01 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Contractor | Facility No. | Building No. | Type of Drawing | Discipline | Main Group | Sub Group | Main Level | Sub Level | Sheet No. | Revision No. |

## SEQUENCE OF OPERATION AS PER TOD



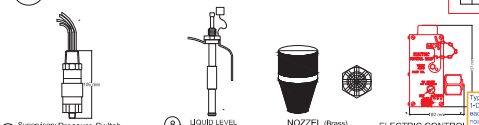

MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 1

| nozzle | type | nozzle DIA | part number |
|---|---|---|---|
| E1-N1 | 360° | 50 mm | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 90-194028-578 |

| QAN | DESCRIPTION | QTY | MODEL NO. |
|---|---|---|---|
| 1 | MAIN CYLINDER WITH CYLINDER VALVE & LLI | 3 PCS | 06-108901-001 |
| 2 | CYLINDER STRAP | 3 PCS | |
| 3 | ELECTRICAL CONTROL HEAD | 1 PCS | 06-118901-003 |
| 4 | SUPERVISORY PRESSURE SWITCH | 1 PCS | 06-118262-001 |
| 5 | FIRE SUPPRESSION CONTROL PANEL | 1 PCS | AFECP-2U |
| 6 | MULTI TONE HORN / STROBE | 1 PCS | H-MHS |
| 7 | MANUAL PULL STATION | 1 PCS | 06-230004-001 |
| 8 | ABORT SWITCH | 1 PCS | 06-270702-010 |
| 9 | PHOTO SMOKE DETECTOR | 48 PCS | D-SP-S |
| 10 | HEAT DETECTOR | 48 PCS | D-SP-S |
| 11 | ALARM BELL 6" | 1 PCS | SBM-6-24 |
| 12 | PRESSURE OPERATED HEAD | 3 PCS | 06-270702-003 |
| 13 | Swing Check Valve 3" | 3 PCS | 06-118906-001 |
| 14 | Actuation hose 3" | 3 PCS | WK-2918B-S000 |
| 15 | Male Elbow 6" Class x 1 1/2" NPT | 3 PCS | WK-2918S5-S00 |
| 16 | Male Connector 6" Class x 1 1/2" NPT | 3 PCS | WK-4918S5-S010 |
| 17 | NODE ASH MODULE | 3 PCS | 06-230004-003 |
| 18 | NODE AO RELAY MODULE | 3 PCS | 06-118004-001 |
| 19 | NODE AI MONITOR MODULE | 1 PCS | 06-117004-001 |
| 20 | NODE RBH RELEASING MODULE | 1 PCS | 06-118004-001 |
| 21 | | | |

## GENERAL COMPONENTS DETAILS

N.T.S




Typical:
1-Distance of last swivel support of each branch before elbow of each nozzle should not exceed 30 cm as per FM 200 manufacturer installation guide.
2-Last threaded rod of last swivel support of each branch before elbow of nozzle should be extended and touching the branch.

Typical:
1-For Nozzle placement: Follow Manufacturer installation Guide manual rules for obstruction and nozzles installation and the Coverage and height limitations per each nozzle to ensure proper agent distribution.

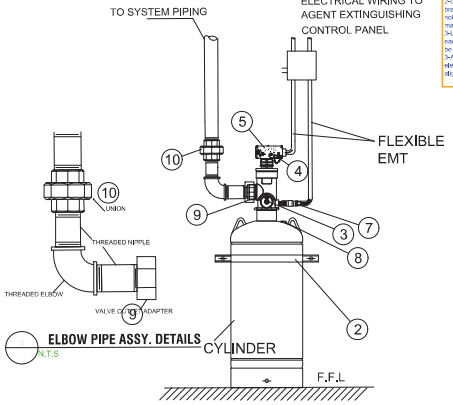
Typical)
1-Contractor is responsible to Avoid obstruction of final location of FM200 Nozzle and HVAC equipment and Cable trays and Duct work) and electrical work & beams of room as per NFPA requirements.

VALVE OUTLET ADAPTORS

| PART NO. | SIZE | A | B | C |
|---|---|---|---|---|
| WK-2539S5-S00 | 3/4mm | GO1/90 (1"x2") | 6.5/16 | 69mm |
| WK-4539S5-S00 | 51mm | GO1/90 (2x2") | 6.5/16 | 76mm |
| WK-2539S6-S00 | 65mm (2½") | GO1/90 (2x2") | 7/80 | 76mm |

## MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS

N.T.S




Typical:
1-All Installed Wrong sizes& Types of Supports on branches should be changed by corrected size, otherwise will be snag list(IF ANY).
2-Distance of last swivel support of each branch before elbow of each nozzle should not exceed 30 cm as per FM 200 manufacturer installation guide.
3-Last threaded rod of last swivel support of each branch before elbow of nozzle should be extended and touching the branch.
3-All firefighting pipes (main lines, branches elevation drops of Nozzel heads) should be alignment.

Typical)
1-All white Teflon shall be painted with final paint
2-All exposed Union and Teflon from threaded fittings should be trimmed and cut
3-All the bad pipes primer paint must be repaired and painted before the final layer of red

| SN | DESCRIPTION |
|---|---|
| 1 | CYLINDER |
| 2 | BRACKET |
| 3 | CYLINDER VALVE |
| 4 | MANUAL LEVER |
| 5 | ELECTRIC CONTROL HEAD |
| 6 | PRESS. SWITCH |
| 7 | SUPERVISORY PRESS. SWITCH |
| 8 | LIQUID LEVEL INDICATOR |
| 9 | OUTLET VALVE ADAPTOR |
| 10 | UNION |
| 11 | MAINTENANCE SWITCH |
| 12 | JUNCTION BOX |
| 13 | FLEXIBLE EMT |

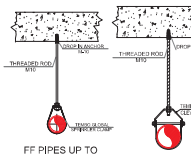
## R SPACING DETAILS ANSI B31.1&MSS SP-58

| PIPE SIZE mm (in) | HANGER SPACING M (ft) |
|---|---|
| 15 (1/2") | 2.4 (8ft) |
| 20 (3/4") | 2.7 (9ft) |
| 25 (1") | 2.7 (9ft) |
| 32 (1 1/4") | 2.7 (9ft) |
| 40 (1 1/2") | 3.7 (12ft) |
| 50 (2") | 4 (13ft) |
| 65 (2 1/2") | 4.3 (14ft) |
| 80 (3") | 4.6 (15ft) |
| 100 (4") | 5.2 (17ft) |

## ELBOW PIPE ASSY. DETAILS

N.T.S

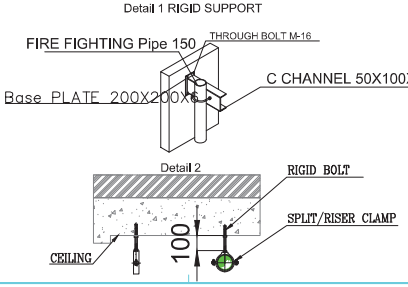
Detail 2



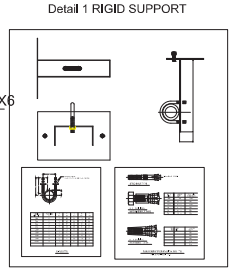

## Pipe Support Detalis

N.T.S

Detail 1 RIGID SUPPORT

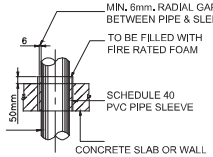



Detail 1 RIGID SUPPORT



## ISOMETRIC VIEW

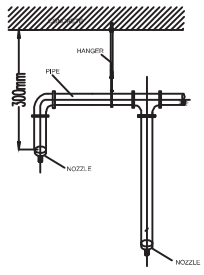
NTS

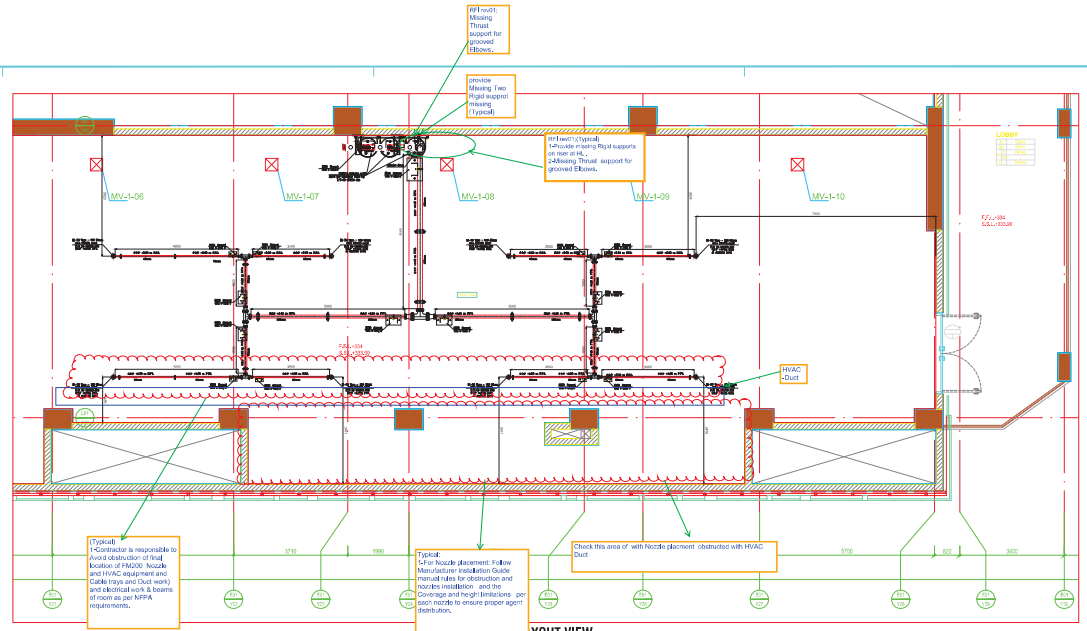

MIN. 6mm. RADIAL GAP BETWEEN PIPE & SLEEVE
TO BE FILLED WITH FIRE RATED FOAM
SCHEDULE 40 PVC PIPE SLEEVE
CONCRETE SLAB OR WALL
50mm
6

PIPE SLEEVE SCHEDULE:

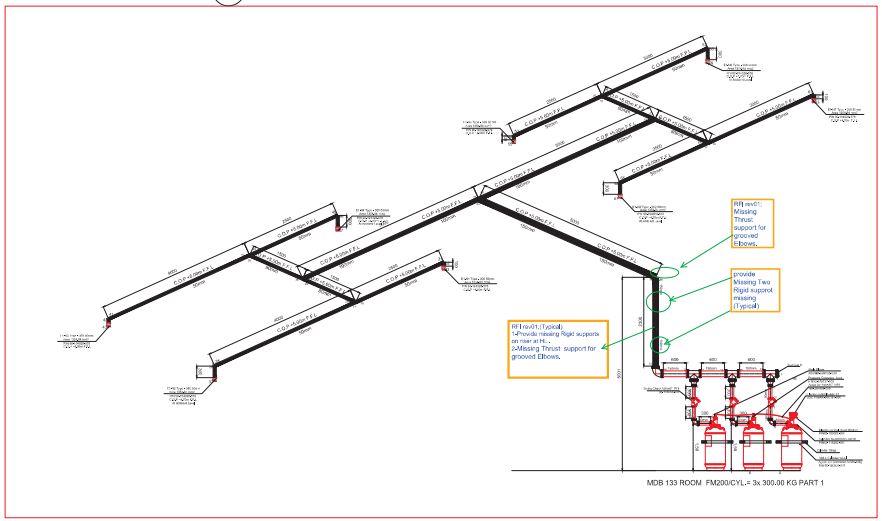
| PIPE SIZE IN MM | SELLVE SIZE IN MM |
|---|---|
| 65 | 100 |
| 100 | 150 |

PIPE SLEEVE GENERAL





RFI rev01: Missing Thrust support for grooved Elbows.
provide Missing Two Rigid support missing (Typical)
RFI rev01 (Typical)
1-Provide missing Rigid supports on riser at HL.
2-Missing Thrust support for grooved Elbows.
MV-1-06
MV-1-07
MV-1-08
MV-1-09
MV-1-10
LOBBY
HVAC Duct
(Typical)
1-Contractor is responsible to Avoid obstruction of final location of FM200 Nozzle and HVAC equipment and Cable trays and Duct work) and electrical work & beams of room as per NFPA requirements.
Typical:
1-For Nozzle placement: Follow Manufacturer installation Guide manual rules for obstruction and nozzles installation and the Coverage and height limitations per each nozzle to ensure proper agent distribution.
Check this area of with Nozzle placment obstructed with HVAC Duct

YOUT VIEW


RFI rev01: Missing Thrust support for grooved Elbows.
provide Missing Two Rigid support missing (Typical)
RFI rev01 (Typical)
1-Provide missing Rigid supports on riser at HL.
2-Missing Thrust support for grooved Elbows.

MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 1

Client:

Ministry of Housing, Utilities & Urban Development

New Urban Communities Authority

Main Consultant:

dar

Sub-Consultant:

SHAKER

Contractor:

Project Name:

Central Business District Of the New Administrative Capital

CBD EAST • PHASE 1

Key Plan:

NORTH

Sub Contractor:

Mechanical Engineering Service & Consulting

mesc

NOTES / LEGEND:

| Legend | Symbol |
|---|---|
| FIRE FIGHTING AND ALARM CONTROL PANEL Model AFECP | F.F.C.P |
| ADDRESSABLE SMOKE DETECTOR Model SD-PH | |
| ADDRESSABLE HEAT DETECTOR Model HD-HPH | |
| FIRE BELL Model MBR-6-24 | |
| STROBE WITH FLASHER Model SBR-A | SF |
| GAS ABORT Model Kidde 878768 | A |
| MANUAL RELEASE Kidde 2000 | M |
| FM200 CYLINDER | |
| Valve Outlet Adapter 3/4" P/N 06-108901-003 | |
| Cylinder Supervisory switch P/NPS-118262-001 | |
| Electric control Head 24 VDC P/NVK-890181-000 | |
| Electric control Head Number P/NHD-100000-000 | |
| FM200 Nozzle | |
| KIDDE RELEASING MODULE RBH P/N 06-400004-001 | |
| KIDDE OUTPUT RELAY MODULE AO P/N 06-400004-001 | |
| KIDDE INPUT MONITOR MODULE AI P/N 06-417004-001 | |
| KIDDE OUTPUT SIGNAL MODULE ASH P/N 06-400004-003 | |

Reference Table:

| Type | No. | Ref./ss. | Date |
|---|---|---|---|
| Drawings | 09 | 51808641800-470-1408641-1800074001101 | 31/03/2019 |
| Documents | | | |

Coordination Table:

| Discipline | Signature | Date |
|---|---|---|
| Architecture | | |
| Structure S. | | 29 APR 2022 |
| Structure E. | | 29 APR 2022 |
| Mechanical | | |
| Plumbing | | 29 APR 2022 |
| HVAC | | |
| Other | | 29 APR 2022 |

Revision Table:

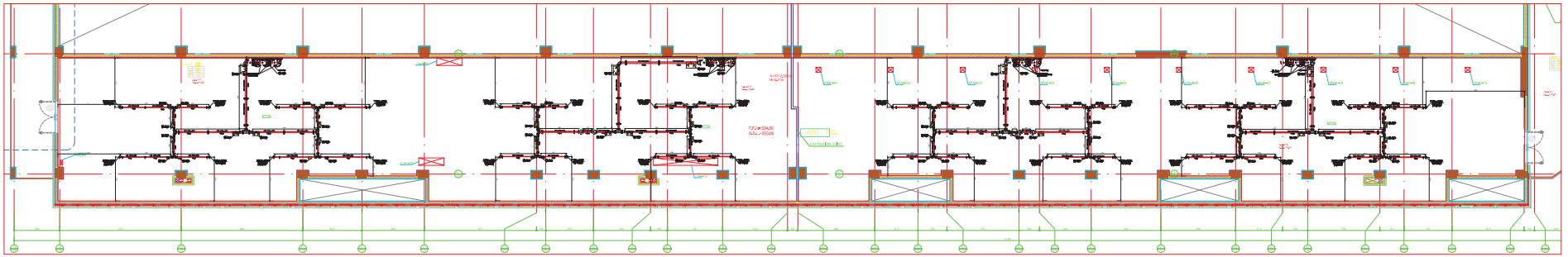
| No. | Description | Date | App. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| 00 | FOR APPROVAL | 14 MAY 2022 | ETISALAT |

Drawing Title:

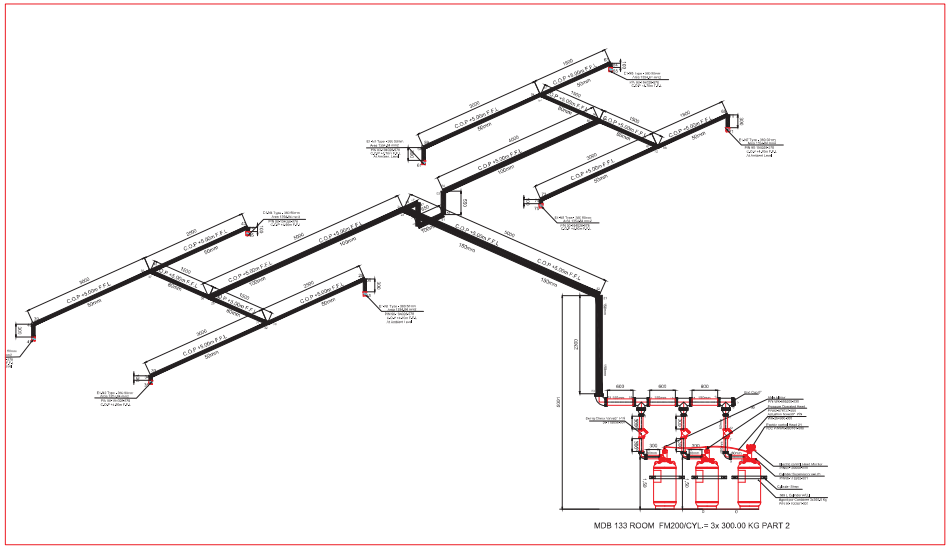
CUC-E01 UTILITY BUILDING
FIRST FLOOR
MBD ROOM 1-133
FM200 SUPPRESSION SYSTEM

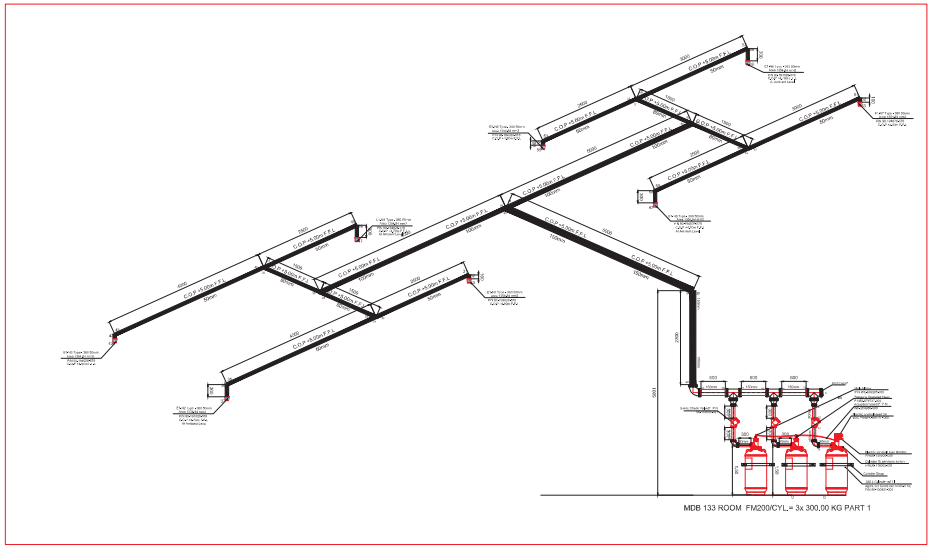
| Designed | Checked | Approved |
|---|---|---|
| SHARY | SHARY | EMAN |
| Drawn | Date | Scale |
| ALAA ALLAM | 17 MAY 2022 | 1:100 |

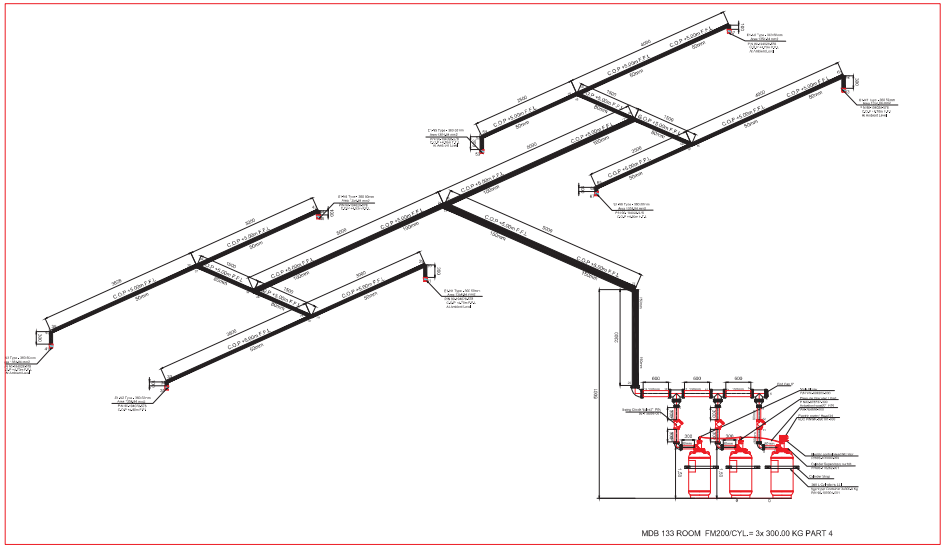
| SHD | CSCEC | 17 | E01 | ME | FF | 04 | 01 | 01 | 0001 | 0002 | 01 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Contractor | Packs No. | Bldg No. | Bldg Type | Sub Bldg | Floor Type | Floor Level | Area No. | Sheet No. | Sequence No. | Rev. No. |

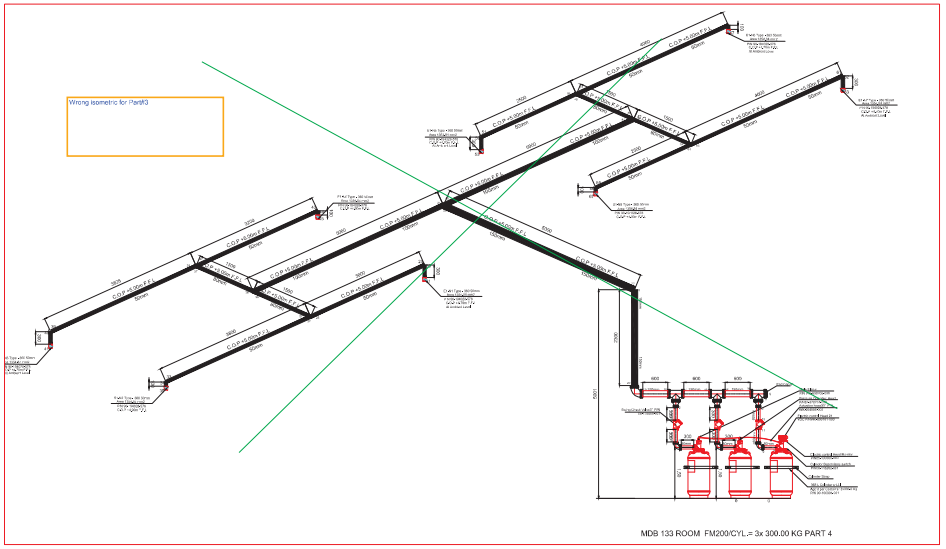


PIPING LAYOUT VIEW
Scale 1:100




Client:
Ministry of Housing, Utilities & Urban Development
New Urban Communities Authority

Main Consultant:
dar Dar Al-Handasah (Egypt)

Sub-Consultant:
SHAKER CONSULTANCY GROUP

Contractor:
中国铁建投资有限公司 CHINA RAILWAY CONSTRUCTION INVEST. COMP. LTD

Project Name:
Central Business District
Of the
New Administrative Capital
CBD EAST • PHASE 1

Key Plan:
NORTH

Sub Contractor:
Mechanical Engineering Service & Consulting
mesc

NOTES / LEGEND:

| Legend | Symbol |
|---|---|
| FIRE FIGHTING AND ALARM CONTROL PANEL Model ARIES | F.F.C.P. |
| ADDRESSABLE SMOKE DETECTOR Model DS-PS | |
| ADDRESSABLE HEAT DETECTOR Model DS-HFS | |
| FIRE BELL Model MBA-4-24 | |
| STROBE WITH PLANTER Model HSR-A | SP |
| GAS ABORT Model Kidde SYNTAX | A |
| MANUAL RELEASE Kidde 2300 | M |
| FM200 CYLINDER | |
| Valve Outlet Adapter 2.5" P/N 76-HSMOE-000 | |
| Cylinder Supervisory switch P/NO6-100200-001 | |
| Electric control Head 24 VDC P/NOE-000101-000 | |
| Electric control Head Resistor P/NO5-100000-000 | |
| FM200 Nozzle | |
| KIDDE RELEASING MODULE DRM P/N 70-000000-001 | |
| KIDDE OUTPUT RELAY MODULE AO P/N 70-000004-001 | |
| KIDDE INPUT MONITOR MODULE AI P/N 70-017000-001 | |
| KIDDE OUTPUT SIGNAL MODULE ASM P/N 70-000000-000 | |

Revision Table:

| No. | Description | Date | Appr. |
|---|---|---|---|
| 00 | FOR APPROVAL | 14 MAY 2023 | ETHAN |

Drawing Title:
CUC-E01 UTILITY BUILDING
FIRST FLOOR
MBD ROOM 1-133
FM200 SUPPRESSION SYSTEM

| Designed | Checked | Approved |
|---|---|---|
| CHAW | GHANY | ETHAN |
| Drawn | Date | Scale |
| AABO ALAA | 17 MAY 2023 | 1:100 |

| SHD | CSCEC | 17 | E01 | ME | FF | 04 | 01 | 01 | 0001 | 0002 | 01 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Contractor | Packs No. | Bldg Type | Area | Sub Comp. | Mech. Type | Floor Level | Part No. | Sheet No. | Segm. No. | Rev. No. |

CSCEC Ltd.(Egypt)
For REI
09 MAY 2023
BK17 OF CBD PROJECT

# Request For Inspection

Date: 9-May-2023

Request no. RFI-CSCEC-17-E01-ME-01-0753-00

**Project No. & Title:** E18066-0200S - The Central Business District of the New Administrative Capital

| Employer: | Engineer: | Sub Consultant: | Contractor: |
|---|---|---|---|
| Arab Republic of Egypt Ministry of Housing, Utilities and Urban Communities New Urban Communities Authority | dar | SHAKER | 中國建築股份有限公司 CHINA STATE CONSTRUCTION ENGRG. CORP. LTD |

We request your attendance to inspect the following works : Mechanical installation of above ground FM-200 fire supression system at MDB Room (1-133) @E01 : between ( E01/Y01TO E01/Y28 &E01/X09 TO E01/X10)

Only piping

1. Type :Buildings ☐ Electrical ☑ Mechanical installations

2. Inspection Time : 10: 00 AM Date : 10/5/2023

| 3. Location: | Zone | Road | Stations | Structure | Other |
|---|---|---|---|---|---|
| | E01 | | | | |

4. Inspection : ◉ First ○ Second ○ Third

RECEIVED
09 MAY 2023
SCG
C.U.C

5. Purpose of Inspection :

1. Electrical
- ☐ Setting out
- ☐ Furniture elect. culvert
- ☐ MV cables
- ☐ Street lighting cables
- ☐ Street lighting poles
- ☐ Telephone duct Bank
- ☐ TV cables
- ☐ Light fittings
- ☐ Sub-stations
- ☐ Civil works & finishings

2. Mechanical
- ☑ Mechanical installations
- ☐ Pumping stations
- ☑ Civil works & finishings

Others (specify)

Particular Details: DWG-CSCEC-17-E01-ME-FF-0026-00

Submitted by : Wang Rui Signature: Wang Rui

6. Inspection report :

| | | Signature |
|---|---|---|
| ☐ Surveyor | 1-Refer to same common comments on RFI-CSCEC-17-E01-ME-GF-0563-04 of obstruction , Modified AS-Built /calculation,supports, painting<br>2- Close SI-17-CUC-ME-0140 before submit RFI<br>3-Close SI-17-CUC-ME-0137 before submit RFI<br>4- on attached Check list should marked for the required activities related to RFI<br>5-Please in cover page of RFI add -Sub- Description shown the components of the FM200 – system related to this RFI Such as ( Pipes, Grooved Fittings/threaded fittings/ Cylinders/ Nozzels, accessories..etc) | |
| ☐ Elect. Eng. | | |
| ☑ Mech. Eng. | | Khaled Awad-09-05-2023 |
| ☐ Civil Eng. | | |
| ☐ | | |

Date/time of inspection : 09-05-2023 Dar:Shady El Sayed / Mahmoud Salah/ Tamer.ElBeltagy (10-05-2023)

7. Engineer's Representative Comments:

Dar 10/05/2023

The works are : ☐ Approved ☐ Approved as Noted ☑ Rejected

Signature Bahaa Shahin Date : 10/05/2023

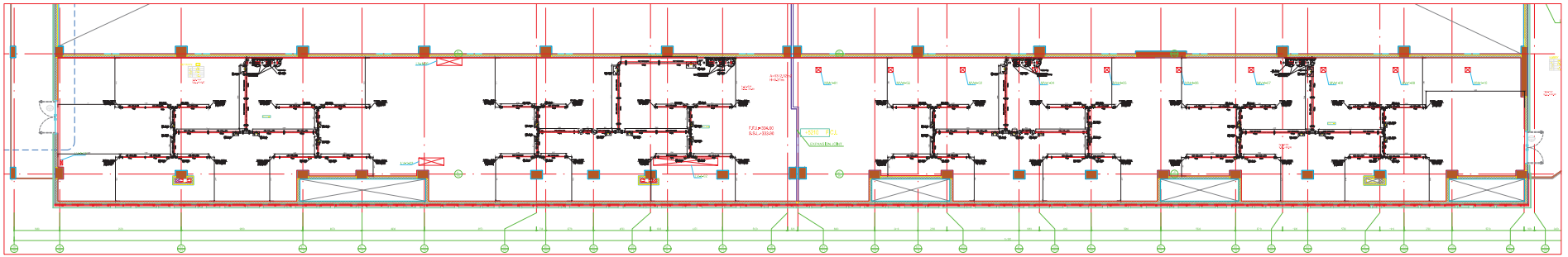
Attach all relevant particular test forms

Approval shall not relieve Contractor of his liabilities under the Contract or constitute authorization of any change to Contract Documents.

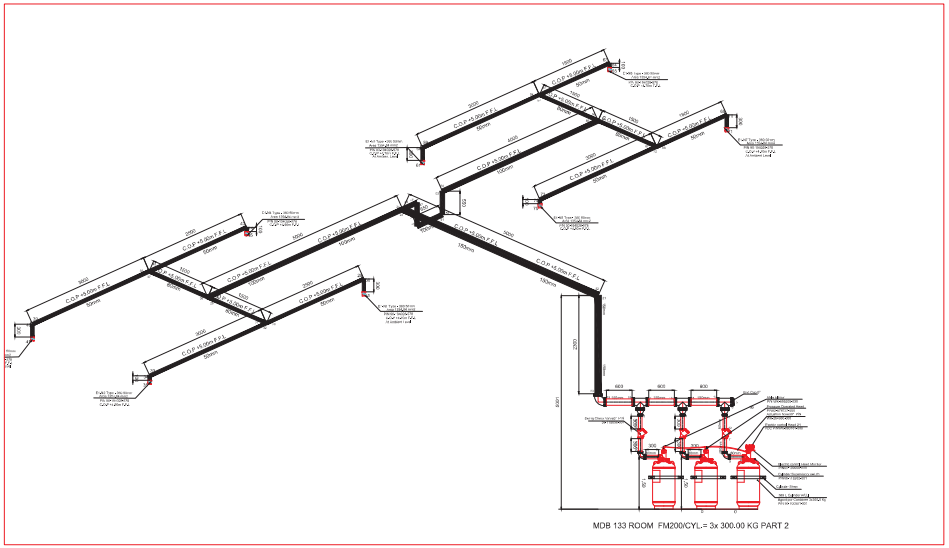
dar

Reply:

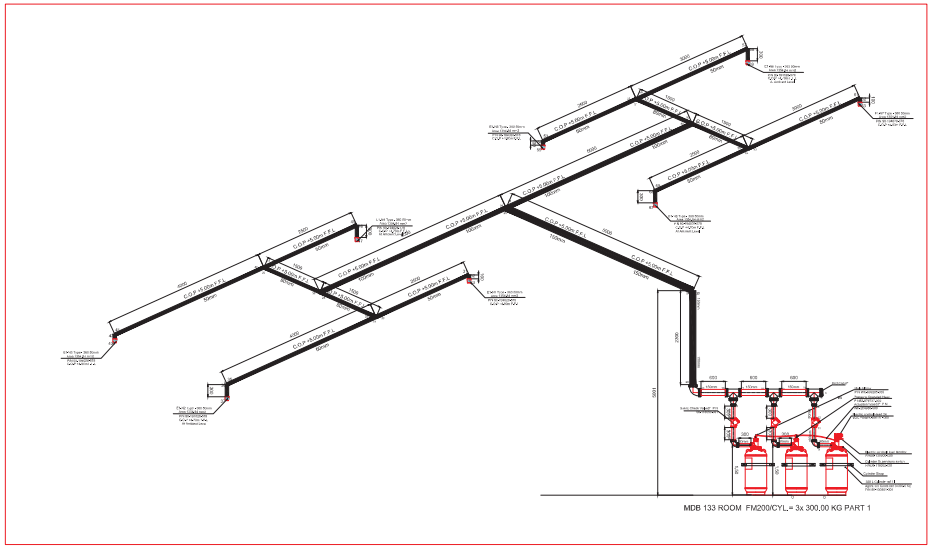
| | CONSULTANT COMMENTS | REPLY |
|---|---|---|
| 1 | Refer to same common comments on RFI-CSCEC-17-E01-ME-GF-0563-04 of obstruction , Modified AS-Built /calculation, supports , painting | Please check attached as-built and calculation |
| 2 | Close SI-17-CUC-ME-0140 before submit RFI | SI will be closed by the approval of installations |
| 3 | Close SI-17-CUC-ME-0137 before submit RFI | SI will be closed by the approval of installations |
| 4 | on attached Check list should marked for the required activities related to RFI | NOTED |
| 5 | Please in cover page of RFI add -Sub- Description shown the components of the FM200 – system related to this RFI Such as (Pipes, Grooved Fittings/threaded fittings/ Cylinders/ Nozzles, accessories.. etc.) | NOTED |



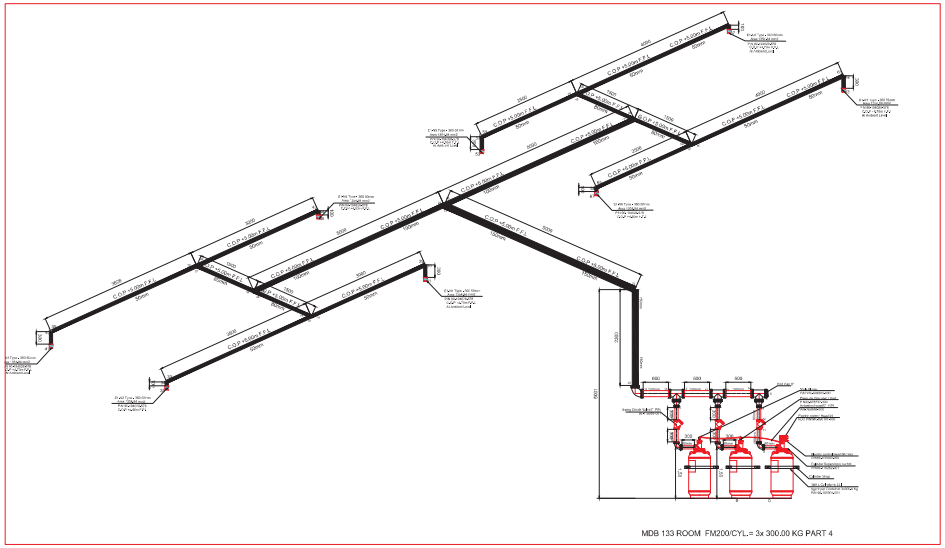
PIPING LAYOUT VIEW
Scale 1:100



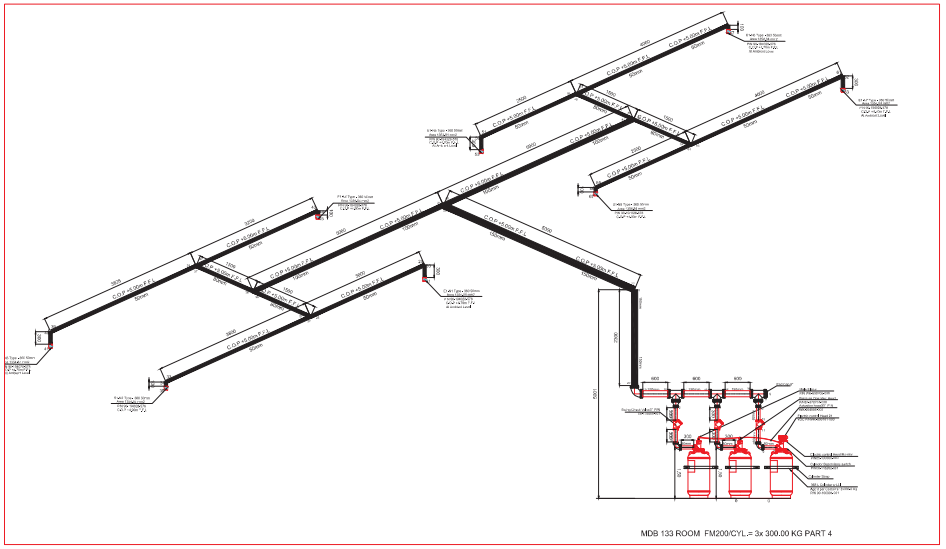
MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 2



MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 1



MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 4



MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 4

Client:
Ministry of Housing, Utilities & Urban Development
New Urban Communities Authority

Main Consultant:
dar Dar Al-Handasah (Egypt)

Sub-Consultant:
SHAKER CONSULTANCY GROUP

Contractor:
中国能源建设集团有限公司 CHINA ENERGY ENGINEERING GROUP CO., LTD.

Project Name:
Central Business District
Of the
New Administrative Capital
CBD EAST • PHASE 1

Key Plan:
NORTH

Sub Contractor:
Mechanical Engineering Service & Consulting
mesc

NOTES / LEGEND:

| Legend | Symbol |
|---|---|
| FIRE FIGHTING AND ALARM CONTROL PANEL Model AM8E | F.F.C.P. |
| ADDRESSABLE SMOKE DETECTOR Model DS-PI | |
| ADDRESSABLE HEAT DETECTOR Model DS-HPI | |
| FIRE BELL Model MBA-4-24 | |
| STROBE WITH PLANTER Model HSR-A | SP |
| GAS ALERT Model Kidde SYNTAX | A |
| MANUAL RELEASE Kidde 2300 | M |
| FM200 CYLINDER | |
| Valve Outlet Adapter 2.5" P/N 76-HSMOE-000 | |
| Cylinder Supervisory switch P/NO6-100200-001 | |
| Electric control Head 24 VDC P/NO6-000201-000 | |
| Electric control Head Resistor P/NO6-100000-000 | |
| FM200 Nozzle | |
| KIDDE RELEASING MODULE DRM P/N 70-000000-001 | |
| KIDDE OUTPUT RELAY MODULE AO P/N 70-000004-001 | |
| KIDDE INPUT MONITOR MODULE AI P/N 70-017000-001 | |
| KIDDE OUTPUT SIGNAL MODULE ASM P/N 70-000000-000 | |

Revision Table:

| No. | Description | Date | App. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| 00 | FOR APPROVAL | 14 MAY 2023 | ETHAN |

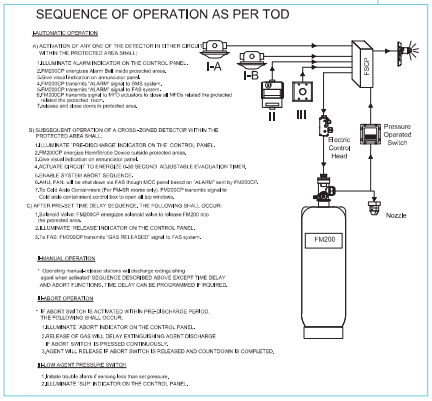
Drawing Title:
CUC-E01 UTILITY BUILDING
FIRST FLOOR
MBD ROOM 1-133
FM200 SUPPRESSION SYSTEM

| Designed | Checked | Approved |
|---|---|---|
| CHANI | QIANY | ETHAN |
| Drawn | Date | Scale |
| AABO ALAA | 17 MAY 2023 | 1:100 |

| SHD | CSCEC | 17 | E01 | ME | FF | 04 | 01 | 01 | 0001 | 0002 | 01 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Contractor | Packg. No. | Bulk. Type | Area | Sub Discp. | Mech. Type | Floor Level | Part No. | Sheet No. | Sequnc. No. | Rev. No. |

# AS-BUILT SHOP DRAWINGS AND CALCULATION REPORTS

## SEQUENCE OF OPERATION AS PER TOD




**AUTOMATIC OPERATION**

A) ACTIVATION OF ANY ONE OF THE DETECTOR IN EITHER CIRCUIT WITHIN THE PROTECTED AREA SHALL:
1.ILLUMINATE "ALARM/INDICATOR ON THE CONTROL PANEL.
2.FM200CP energizes Alarm Bell inside protected areas.
3.Give visual indication on annunciator panel.
4.FM200CP transmits "ALARM" signal to BMS system.
5.FM200CP transmits "ALARM" signal to FAS system.
6.FM200CP transmits signal to MVO actuators to close all MFDs related the protected / related the protected room.
7.Releases and close doors in protected area.

B) SUBSEQUENT OPERATION OF A CROSS-ZONED DETECTOR WITHIN THE PROTECTED AREA SHALL:
1.ILLUMINATE PRE-DISCHARGE INDICATOR ON THE CONTROL PANEL.
2.FM200CP energize Horn/Strobe Device outside protected areas.
3.Give visual indication on annunciator panel.
4.ACTUATE CIRCUIT TO ENERGIZE (30 SECOND ADJUSTABLE EVACUATION TIMER.
5.ENABLE SYSTEM ABORT SEQUENCE.
6.AHU, FAN will be shut down via FAS through MCC panel based on "ALARM" sent by FM200CP.
7.To Cold Aisle Containment (For FM-200 zones only) FM200CP transmits signal to Cold aisle containment control box to open all top windows.

C) AFTER PRE-SET TIME DELAY SEQUENCE, THE FOLLOWING SHALL OCCUR:
1.Solenoid valve (1400CP energizes solenoid valve to release FM200 into the protected area.
2.ILLUMINATE "RELEASE" INDICATOR ON THE CONTROL PANEL.
3.To FAS: FM200CP transmits "GAS RELEASED" signal to FAS system.

**MANUAL OPERATION**

* Operating manual-release stations will discharge extinguishing agent when activated SEQUENCE DESCRIBED ABOVE EXCEPT TIME DELAY AND ABORT FUNCTIONS. TIME DELAY CAN BE PROGRAMMED IF REQUIRED.

**ABORT OPERATION**

* IF ABORT SWITCH IS ACTIVATED WITH PRE-DISCHARGE PERIOD, THE FOLLOWING SHALL OCCUR:
1.ILLUMINATE "ABORT" INDICATOR ON THE CONTROL PANEL.
2.RELEASE OF GAS WILL DELAY EXTINGUISHING AGENT DISCHARGE IF ABORT SWITCH IS PRESSED CONTINUOUSLY.
3.AGENT WILL RELEASE IF ABORT SWITCH IS RELEASED AND COUNTDOWN IS COMPLETED.

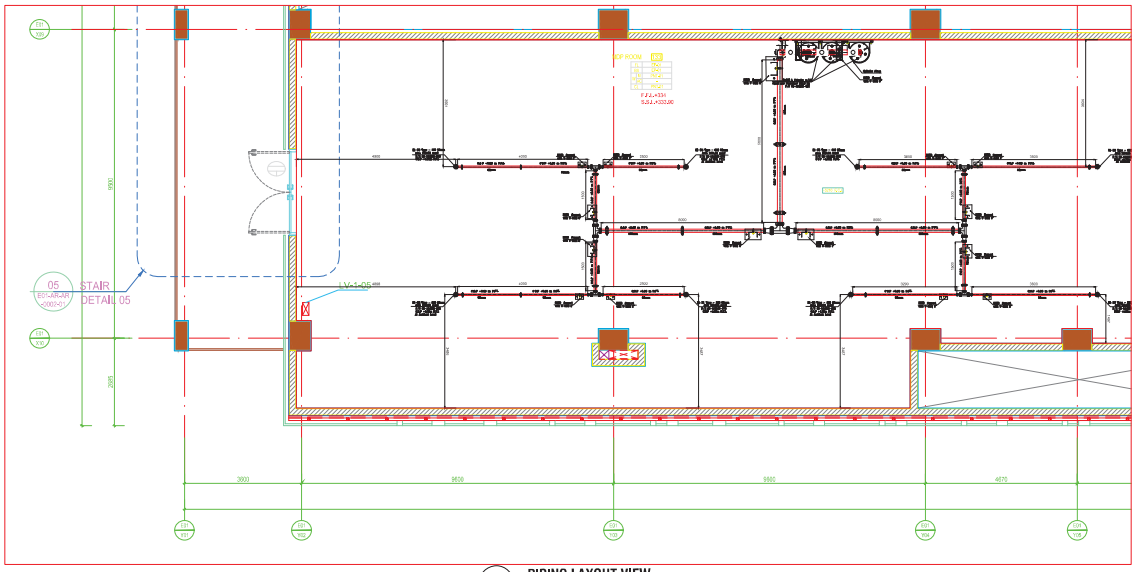
**BLOW AGENT PRESSURE SWITCH**

* 1.Initiate trouble alarm if sensing less than set pressure.
2.ILLUMINATE "SUP. INDICATOR ON THE CONTROL PANEL.

MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 4

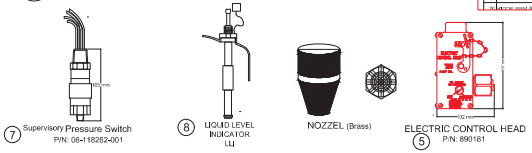
| nozzle | type | nozzle DIA | part number |
|---|---|---|---|
| E1-N1 | 360° | 50 mm | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 90-194028-578 |

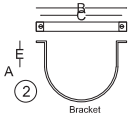
| S/NO. | | QTY | MODEL NO. |
|---|---|---|---|
| 1 | MAIN CYLINDER WITH CYLINDER VALVE & LLI | 5 | PCS 60-180915-001 |
| 2 | CYLINDER STRAP | 5 | PCS |
| 3 | ELECTRICAL CONTROL HEAD | 1 | PCS 60-180158-003 |
| 4 | SUPERVISORY PRESSURE SWITCH | 5 | PCS 05-180363-001 |
| 5 | FIRE SUPPRESSION CONTROL PANEL | 1 | PCS ARIES 2U |
| 6 | MULTI TONE HORN / STROBE | 1 | PCS 1570-A |
| 7 | MANUAL PULL STATION | 1 | PCS 04-200002-001 |
| 8 | ABORT SWITCH | 1 | PCS 04-270753-010 |
| 9 | PHOTO SMOKE DETECTOR | 60 | PCS DS-PS |
| 10 | HEAT DETECTOR | 60 | PCS DS4-HFS |
| 11 | ALARM BELL 6 " | 1 | PCS 1624-0-01 |
| 12 | PRESSURE OPERATED HEAD | 2 | PCS 60-470732-003 |
| 13 | Swing Check Valve 3" | 3 | PCS 05-180584-001 |
| 14 | Actuation hose 3 " | 2 | PCS WK-269389-000 |
| 15 | Male Elbow 90° Rp= x 1/8" NPT | 2 | PCS WK-269230-000 |
| 16 | Male Connector 45° Rp= x 1/8" NPT | 2 | PCS WK-269233-010 |
| 17 | KIDDE ASM MODULE | 2 | PCS 70-269390-003 |
| 18 | KIDDE AO RELAY MODULE | 0 | PCS 70-468004-001 |
| 19 | KIDDE AI MONITOR MODULE | 7 | PCS 70-417008-001 |
| 20 | KIDDE SMART BELL ADDRS MODULE | 1 | PCS 70-468002-001 |

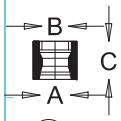



### PIPING LAYOUT VIEW
Scale 1:100

## GENERAL COMPONENTS DETAILS
N.T.S



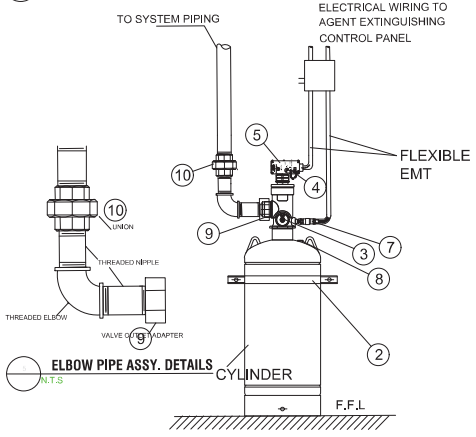




VALVE OUTLET ADAPTORS

| PART NO. | SIZE | A | B | C | D | WEIGHT |
|---|---|---|---|---|---|---|
| WK-269354-000 | 34mm | (DC-V2) (1-1/2") | 1,974 | 66mm | 82mm | 0,2 kg |
| WK-269355-000 | 51mm | (DC-V3) (2") | 2,000 | 76mm | 76mm | 0,3 kg |
| WK-269356-000 | 66mm (2½") | (DC-V5) (3-1/2") | 3,00 | 76mm | 95mm | 0,6 kg |

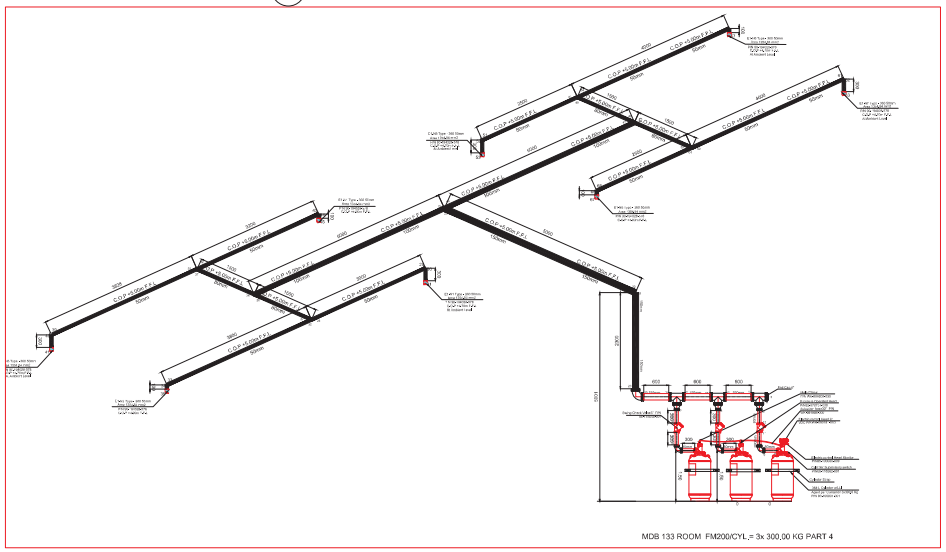
## MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS
N.T.S




| MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS | |
|---|---|
| SN | DESCRIPTION |
| 1 | CYLINDER |
| 2 | BRACKET |
| 3 | CYLINDER VALVE |
| 4 | MANUAL LEVER |
| 5 | ELECTRIC CONTROL HEAD |
| 6 | PRESS. SWITCH |
| 7 | SUPERVISORY PRESS. SWITCH |
| 8 | LIQUID LEVEL INDICATOR |
| 9 | OUTLET VALVE ADAPTOR |
| 10 | UNION |
| 11 | MAINTENANCE SWITCH |
| 12 | JUNCTION BOX |
| 13 | FLEXIBLE EMT |

HANGER SPACING DETAILS AS PER ANSI B31.1&MSS SP-58

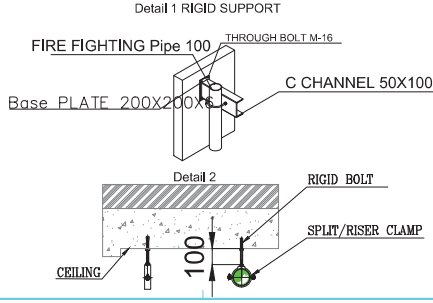
| PIPE SIZE mm (in) | HANGER SPACING M (ft) |
|---|---|
| 15 (1/2") | 2.4 (8ft) |
| 20 (3/4") | 2.7 (9ft) |
| 25 (1") | 2.7 (9ft) |
| 32 (1 1/4") | 2.7 (9ft) |
| 40 (1 1/2") | 3.7 (12ft) |
| 50 (2") | 4 (13ft) |
| 65 (2 1/2") | 4.3 (14ft) |
| 80 (3") | 4.6 (15ft) |
| 100 (4") | 5.2 (17ft) |

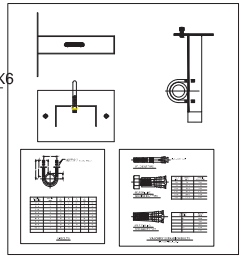



## ELBOW PIPE ASSY. DETAILS
N.T.S

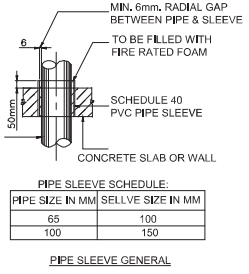



## Pipe Support Detalis
N.T.S



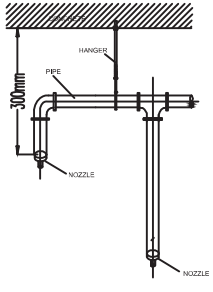

## ISOMETRIC VIEW
NTS


MIN. 6mm. RADIAL GAP BETWEEN PIPE & SLEEVE
6
TO BE FILLED WITH FIRE RATED FOAM
SCHEDULE 40 PVC PIPE SLEEVE
50mm
CONCRETE SLAB OR WALL

PIPE SLEEVE SCHEDULE:

| PIPE SIZE IN MM | SELLVE SIZE IN MM |
|---|---|
| 65 | 100 |
| 100 | 150 |

PIPE SLEEVE GENERAL




Client:
Ministry of Housing, Utilities & Urban Development
New Urban Communities Authority

Main Consultant:
dar

Sub-Consultant:
SHAKER

Contractor:

Project Name:
Central Business District Of the New Administrative Capital
CBD EAST - PHASE 1

Key Plan:
NORTH

Sub Contractor:
Mechanical Engineering Service & Consulting
mesc

NOTES / LEGEND:

| Legend | Symbol |
|---|---|
| FIRE FIGHTING AND ALARM/CONTROL PANEL Model ARIES | F.F.C.P |
| ADDRESSABLE SMOKE DETECTOR Model DS-PS | |
| ADDRESSABLE HEAT DETECTOR Model DS-HFS | |
| FIRE BELL Model MBA-6-24 | |
| STROBE WITH FLASHER Model SBH-A | SF |
| GAS ABORT Model Kidde 878782 | A |
| MANUAL RELEASE Kidde 5900 | M |
| FM200 CYLINDER | |
| Valve Outlet Adapter 2.5" P/N WK-269002-000 | |
| Cylinder Supervisory switch P/N06-118001-001 | |
| Electric control Head 24 VDC P/NWK-890181-000 | |
| Electric control Head Monitor P/N05-180000-000 | |
| FM200 Nozzle | |
| KIDDE SMART BELL ADDRS MODULE ASM P/N 70-468002-001 | |
| KIDDE OUTPUT RELAY MODULE AO P/N 70-468004-001 | |
| KIDDE INPUT MONITOR MODULE AI P/N 70-417008-001 | AI |
| KIDDE OUTPUT SIGNAL MODULE ASM P/N 70-269390-003 | |

Revision Table:

| No. | Description | Date | Apv. |
|---|---|---|---|
| 05 | FOR APPROVAL | 14 MAY 2023 | ETHAN. |

Drawing Title:
CUC-E01 UTILITY BUILDING
FIRST FLOOR
MBD ROOM 1-133
FM200 SUPPRESSION SYSTEM

| Designed | Checked | Approved |
|---|---|---|
| DHWY | GHAM | ETHAN |
| Drawn | Date | Scale |
| AJARO ALLAM | 17 MAY 2023 | 1:100 |

| SHD | CSCEC | 17 | E01 | ME | FF | 04 | 01 | 01 | 0001 | 0002 | 01 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Contractor | Profile No. | Build. Type | Discip. | Sub Discip. | Plan Type | Floor Level | Part No. | Sheet No. | Sequence No. | Rev. No. |

KFS Hydraulic Flow Calculation Program v4.00 (HFC-227ea)
UL: EX4674 / Component of FM Approved System

File Name: FM200 calculation Report for E01-FirstFloor-MDB ROOM (133) PART1 OF4 18-05-2023.FC4

## Consolidated Report

## Customer Information

Company Name: CSCEC
Address:

Phone:
Contact:
Title:

## Project Data

Project Name: CBD - (CUC) - E01
Designer: MESC
Number:
Account:
Location:
Description: Hydraulic calculation for MDB ROOM (133) PART1 OF4

## Enclosure Report

Elevation: 326 m (relative to sea level)
Atmospheric Correction Factor: 0.96 (NFPA 2001)

Enclosure 1 MDB ROOM (133) PART1 OF4

Enclosure Temperature:
Minimum: 21.0 C
Maximum: 40.0 C
Max. Concentration: 7.45% (At 40.0 C)
Design Concentration:

Number of Nozzles: 8
Width: 11.33 m
Length: 28.97 m
Height: 5.21 m
Volume: 1710.08 m ³

Calculation Date/Time: Thursday, May 18, 2023, 8:46:02 AM
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Key ID: 181643511

Kidde Fire Systems

## Consolidated Report

| | | | |
|---|---|---|---|
| Adjusted: | 7.00 % | Non-permeable: | 0.00 m ³ |
| Minimum: | 7.00 % | Total Volume: | 1710.08 m ³ |
| Min. Agent Required: | 899.33 kg | | |
| Adjusted Agent Required: | 900.00 kg | | |

## Agent Source Report

| | |
|---|---|
| Agent: | HFC-227ea |
| Cylinder Name: | 368 L Cylinder w/LLI |
| Cylinder Part Number: | 90-100901-001 |
| Agent Per Cylinder: | 300.00 kg |
| Fill Density: | 0.815 kg / l |
| Number of Main Cylinders: | 3 |
| Number of Reserve Cylinders: | 0 |
| Cylinder Empty Weight: | 229.10 kg |
| Weight, All Cylinders + Agent: | 1587.30 kg |
| Floor Area Per Cylinder: | 0.29 m ² |
| Floor Loading Per Cylinder: | 1824 kg /m ² |


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Key ID: 181643511

Kidde Fire Systems

# Consolidated Report

## Parts Report

Total Agent Required: 900.00 kg

Cylinder Name: 368 L Cylinder w/LLI (Part: 90-100901-001)

Number of Cylinders: 3

| Nozzle | Type | Nozzle Diameter | Nozzle Area | Part Number |
|---|---|---|---|---|
| E1-N1 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |

| Pipe & Fittings | Type | Diameter | Length | Elbows (90) | Elbows (45) | Tees | Unions |
|---|---|---|---|---|---|---|---|
| | 40W | 50 mm | 25.60 m | 8 | 0 | 0 | 0 |
| | 40W | 80 mm | 7.32 m | 3 | 0 | 4 | 0 |
| | 40W | 100 mm | 10.00 m | 0 | 0 | 2 | 0 |
| | 40W | 150 mm | 9.26 m | 2 | 0 | 4 | 0 |

| Other Objects | Name | Quantity | Part Number |
|---|---|---|---|
| | 80 mm Swing Check Valve | 3 | 06-118058-001 |
| | End Cap | 1 | N/A |

## System Acceptance Report

Calculation Date/Time: Thursday, May 18, 2023, 8:46:02 AM

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Key ID: 181643511

Kidde Fire Systems

# Consolidated Report

| | |
|---|---|
| System Discharge Time: | 8.2 seconds |
| Percent Agent In Pipe: | 57.7% |
| Percent Agent Before First Tee: | 31.8% |
| Dead Volume: | 0.0% (0.01 kg) |

| | |
|---|---|
| Enclosure Number: | 1 |
| Enclosure Name: | MDB ROOM (133) PART1 OF4 |
| Minimum Design Concentration: | 7.00% |
| Adjusted Design Concentration: | 7.00% |
| Predicted Concentration: | 7.01% |
| Maximum Expected Agent Concentration: | 7.45% (At 40.0 C) |

| | |
|---|---|
| Maximum Allowed Enclosure Pressure: | 500.00 Pa |
| Estimated Free Vent Area Required (Negative): | 0.61 $m^2$ |
| Estimated Free Vent Area Required (Positive): | 0.16 $m^2$ |
| Installed Vent Area: | 0.00 $m^2$ |
| Predicted Enclosure Pressure (Negative): | N/A |
| Predicted Enclosure Pressure (Positive): | N/A |
| Maximum Enclosure Flow Rate: | 137.39 kg/s |

| Nozzle | Minimum Agent Required | Adjusted Agent Required | Predicted Agent Delivered | Average Nozzle Pressure |
|---|---|---|---|---|
| E1-N1 | 112.43 kg | 112.51 kg | 113.84 kg | 6.960 bar |
| E1-N2 | 112.42 kg | 112.50 kg | 112.54 kg | 6.863 bar |
| E1-N3 | 112.42 kg | 112.50 kg | 112.54 kg | 6.863 bar |
| E1-N4 | 112.42 kg | 112.50 kg | 113.84 kg | 6.960 bar |
| E1-N5 | 112.42 kg | 112.50 kg | 113.94 kg | 6.955 bar |
| E1-N6 | 112.42 kg | 112.50 kg | 109.68 kg | 6.675 bar |
| E1-N7 | 112.42 kg | 112.50 kg | 109.68 kg | 6.675 bar |
| E1-N8 | 112.41 kg | 112.49 kg | 113.94 kg | 6.955 bar |
| Total | 899.36 kg | 900.00 kg | 900.00 kg | |

Calculation Date/Time: Thursday, May 18, 2023, 8:46:02 AM

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Key ID: 181643511

# Consolidated Report

## Pipe Network Report

| Description | Pipe Section | Start Node | End Node | Pipe Type | Pipe Diameter | Pipe Length | Union | Total Elevation Change | Total Equivalent Length | Nozzle Name | Nozzle Size | Nozzle Type | Nozzle Area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cylinder - On | ManR. | 0 | 8 | | 80 mm | 1.50 m | 0 | 1.50 m | 15.24 m | | | | |
| Pipe | ManR. | 8 | 9 | 40W | 80 mm | 0.30 m | 0 | ------ | 0.30 m | | | | |
| Elbow (90) | ManR. | 9 | 10 | 40W | 80 mm | ------ | 0 | ------ | 1.25 m | | | | |
| Pipe | ManR. | 10 | 11 | 40W | 80 mm | 0.07 m | 0 | 0.07 m | 0.07 m | | | | |
| Check Valve -> | ManR. | 11 | 12 | | 80 mm | 0.24 m | 0 | 0.24 m | 3.96 m | | | | |
| Pipe | ManR. | 12 | 13 | 40W | 80 mm | 0.07 m | 0 | 0.07 m | 0.07 m | | | | |
| Tee | Man. | 13 | 14 | 40W | 150 mm | ------ | 0 | ------ | 6.16 m | | | | |
| Pipe | Man. | 14 | 15 | 40W | 150 mm | 0.60 m | 0 | ------ | 0.60 m | | | | |
| Tee | Man. | 15 | 16 | 40W | 150 mm | ------ | 0 | ------ | 2.01 m | | | | |
| Pipe | Man. | 16 | 17 | 40W | 150 mm | 0.60 m | 0 | ------ | 0.60 m | | | | |
| Tee | Man. | 17 | 18 | 40W | 150 mm | ------ | 0 | ------ | 2.01 m | | | | |
| Pipe | Man./End | 18 | 19 | 40W | 150 mm | 0.30 m | 0 | ------ | 0.30 m | | | | |
| Elbow (90) | System | 19 | 20 | 40W | 150 mm | ------ | 0 | ------ | 2.47 m | | | | |
| Pipe | System | 20 | 21 | 40W | 150 mm | 2.76 m | 0 | 2.76 m | 2.76 m | | | | |
| Elbow (90) | System | 21 | 22 | 40W | 150 mm | ------ | 0 | ------ | 2.47 m | | | | |
| Pipe | System | 22 | 23 | 40W | 150 mm | 5.00 m | 0 | ------ | 5.00 m | | | | |
| Tee | System | 23 | 24 | 40W | 100 mm | ------ | 0 | ------ | 4.08 m | | | | |
| Pipe | System | 24 | 25 | 40W | 100 mm | 5.00 m | 0 | ------ | 5.00 m | | | | |
| Tee | System | 25 | 26 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 26 | 27 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |
| Tee | System | 27 | 28 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 28 | 29 | 40W | 50 mm | 2.50 m | 0 | ------ | 2.50 m | | | | |
| Elbow (90) | System | 29 | 30 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 30 | 31 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N1 | 50 mm | 360° | 1354.84 mm $^2$ |
| Tee | System | 27 | 32 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 32 | 33 | 40W | 50 mm | 3.00 m | 0 | ------ | 3.00 m | | | | |
| Elbow (90) | System | 33 | 34 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 34 | 35 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N2 | 50 mm | 360° | 1354.84 mm $^2$ |
| Tee | System | 25 | 36 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 36 | 37 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |
| Tee | System | 37 | 38 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 38 | 39 | 40W | 50 mm | 3.00 m | 0 | ------ | 3.00 m | | | | |

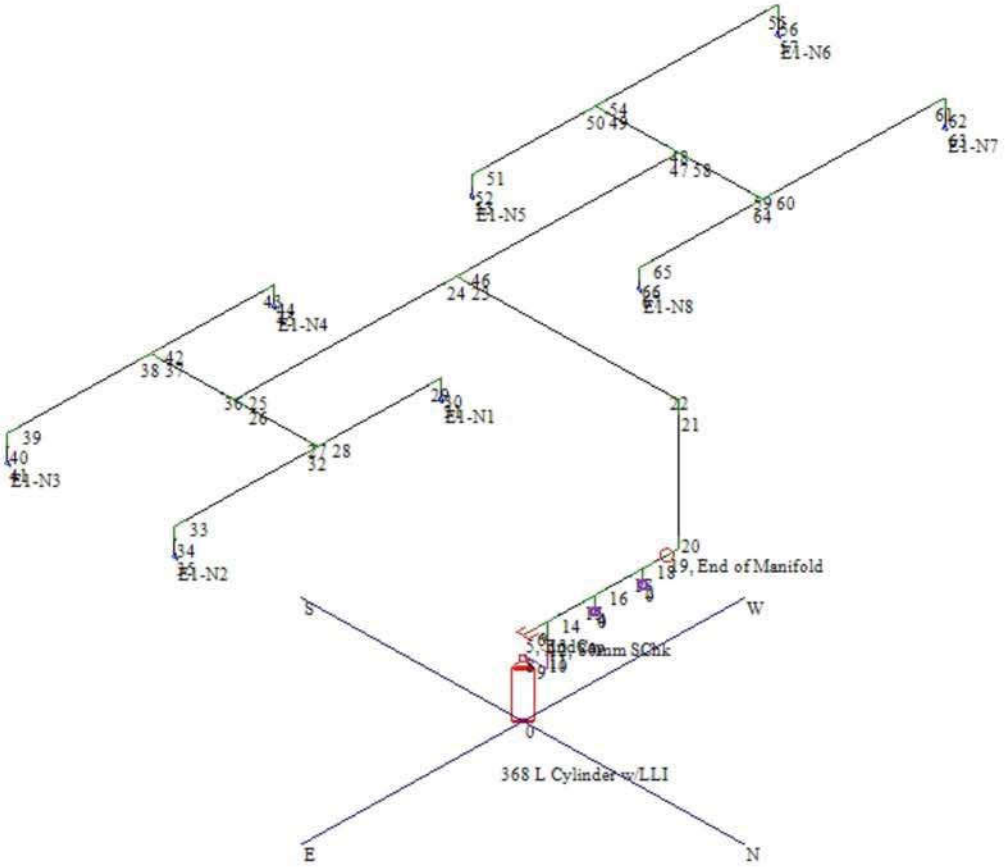
# Consolidated Report

| Description | Pipe Section | Start Node | End Node | Pipe Type | Pipe Diameter | Pipe Length | Union | Total Elevation Change | Total Equivalent Length | Nozzle Name | Nozzle Size | Nozzle Type | Nozzle Area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elbow (90) | System | 39 | 40 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 40 | 41 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N3 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 37 | 42 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 42 | 43 | 40W | 50 mm | 2.50 m | 0 | ------ | 2.50 m | | | | |
| Elbow (90) | System | 43 | 44 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 44 | 45 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N4 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 23 | 46 | 40W | 100 mm | ------ | 0 | ------ | 4.08 m | | | | |
| Pipe | System | 46 | 47 | 40W | 100 mm | 5.00 m | 0 | ------ | 5.00 m | | | | |
| Tee | System | 47 | 48 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 48 | 49 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |
| Tee | System | 49 | 50 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 50 | 51 | 40W | 50 mm | 2.50 m | 0 | ------ | 2.50 m | | | | |
| Elbow (90) | System | 51 | 52 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 52 | 53 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N5 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 49 | 54 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 54 | 55 | 40W | 50 mm | 4.00 m | 0 | ------ | 4.00 m | | | | |
| Elbow (90) | System | 55 | 56 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 56 | 57 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N6 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 47 | 58 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 58 | 59 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |
| Tee | System | 59 | 60 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 60 | 61 | 40W | 50 mm | 4.00 m | 0 | ------ | 4.00 m | | | | |
| Elbow (90) | System | 61 | 62 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 62 | 63 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N7 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 59 | 64 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 64 | 65 | 40W | 50 mm | 2.50 m | 0 | ------ | 2.50 m | | | | |
| Elbow (90) | System | 65 | 66 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 66 | 67 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N8 | 50 mm | 360° | 1354.84 mm ² |
| Tee | Man. | 2 | 18 | 40W | 150 mm | ------ | 0 | ------ | 6.16 m | | | | |
| Cylinder + | Man. | 0 | 2 | 40W | 80 mm | 2.18 m | 0 | 1.88 m | 15.24 m | | | | |
| Tee | Man. | 4 | 16 | 40W | 150 mm | ------ | 0 | ------ | 6.16 m | | | | |
| Cylinder + | Man. | 0 | 4 | 40W | 80 mm | 2.18 m | 0 | 1.88 m | 15.24 m | | | | |
| Tee | Man. | 6 | 14 | 40W | 150 mm | ------ | 0 | ------ | 2.01 m | | | | |

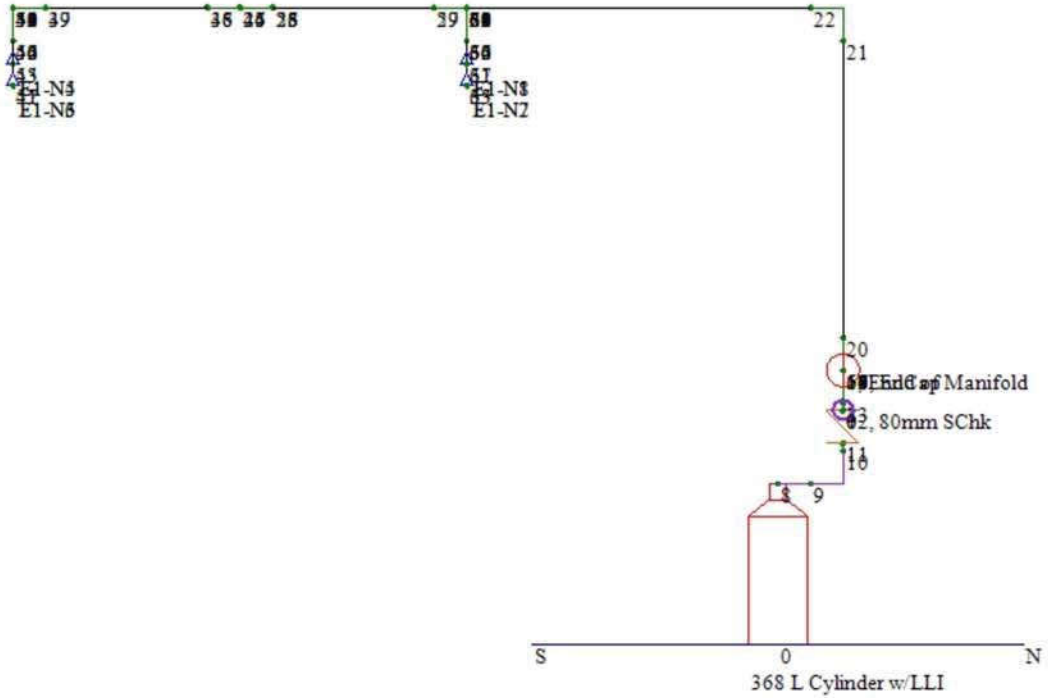
# Consolidated Report

| Description | Pipe Section | Start Node | End Node | Pipe Type | Pipe Diameter | Pipe Length | Union | Total Elevation Change | Total Equivalent Length | Nozzle Name | Nozzle Size | Nozzle Type | Nozzle Area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| End Cap | Man. | 5 | 6 | 40W | 150 mm | 0.10 m | 0 | ------ | 999.00 m | | | | |

# Consolidated Report

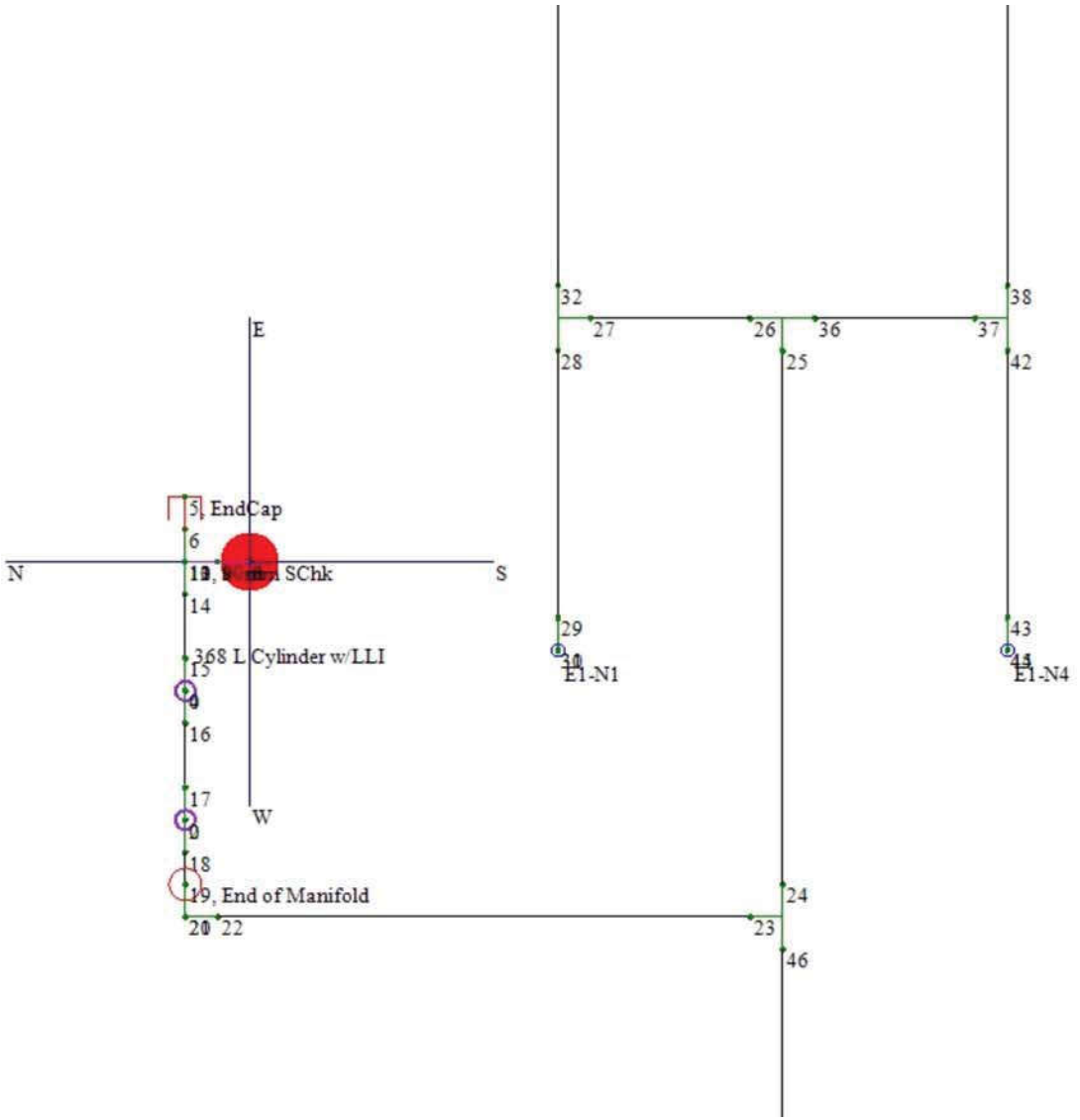


View #: 5 - Standard Elevation View

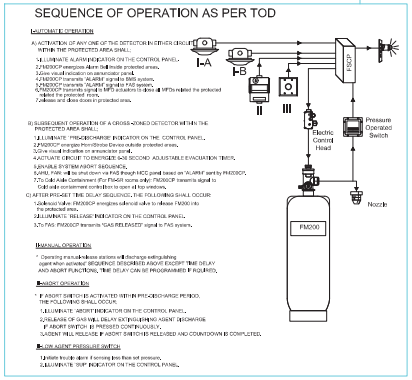


# Consolidated Report

View #: 9 - Standard Plan View



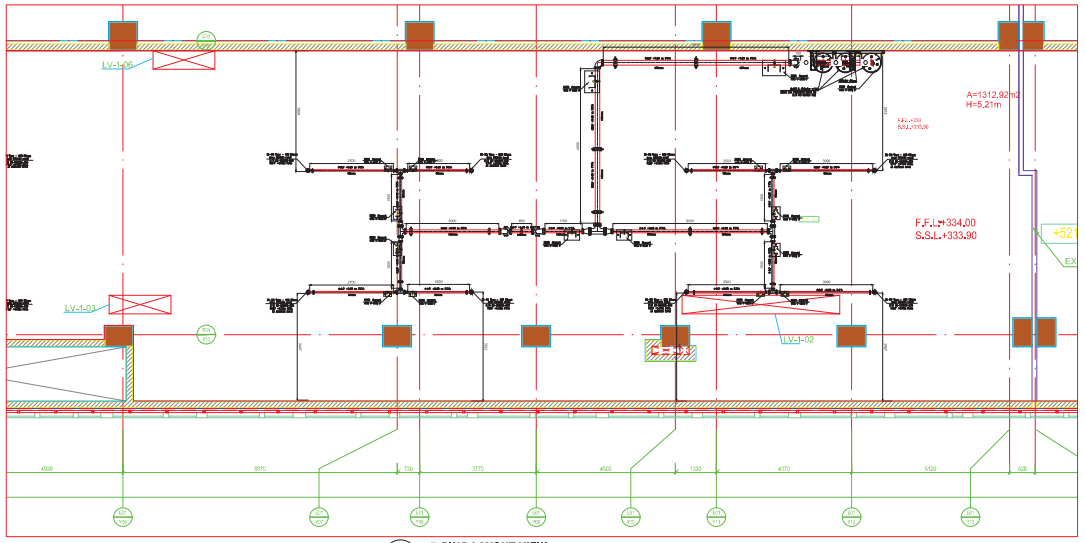
## SEQUENCE OF OPERATION AS PER TOD




MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 3

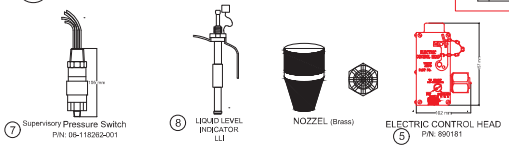
| nozzle | type | nozzle DIA | part number |
|---|---|---|---|
| E1-N1 | 360° | 50 mm | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 90-194028-576 |

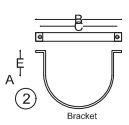
| QAS | | QTY | MODEL NO. |
|---|---|---|---|
| 1 | MAIN CYLINDER WITH CYLINDER VALVE & LLI | 3 PCS | 90-194061-031 |
| 2 | CYLINDER STRAP | 3 PCS | |
| 3 | ELECTRICAL CONTROL HEAD | 3 PCS | 90-195015-030 |
| 4 | SUPERVISORY PRESSURE SWITCH | 3 PCS | 90-193824-031 |
| 5 | FIRE SUPPRESSION CONTROL PANEL | 1 PCS | AFES-220 |
| 6 | MULTI TONE HORN / STROBE | 1 PCS | HSPA |
| 7 | MANUAL PULL STATION | 1 PCS | 90-193030-031 |
| 8 | ABORT SWITCH | 1 PCS | 90-193152-030 |
| 9 | PHOTO SMOKE DETECTOR | 44 PCS | DS-PR |
| 10 | HEAT DETECTOR | 44 PCS | DS-HFR |
| 11 | ALARM BELL 6" | 1 PCS | MB-A6-24 |
| 12 | PRESSURE OPERATED HEAD | 3 PCS | 02-078737-030 |
| 13 | Swing Check Valve 3" | 3 PCS | 90-193824-031 |
| 14 | Actuator Hose 1" | 3 PCS | WK-200035-003 |
| 15 | Male Elbow ⊕ Type x 1/8" NPT | 3 PCS | WK-200035-039 |
| 16 | Male Connector ⊕ * Type x 1/8" NPT | 3 PCS | WK-200074-013 |
| 17 | XDGS ASM MODULE | 2 PCS | 90-193030-033 |
| 18 | XDGS AC RELAY MODULE | 3 PCS | 90-195004-031 |
| 19 | XDGS IM MONITOR MODULE | 1 PCS | 90-197005-031 |
| 20 | XDGS WM RELEASING MODULE | 3 PCS | 90-193030-031 |
| 21 | | | |




### PIPING LAYOUT VIEW
Scale 1:100

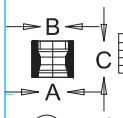
## GENERAL COMPONENTS DETAILS
N.T.S



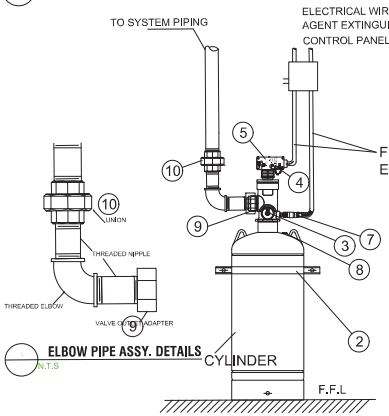




VALVE OUTLET ADAPTORS

| PART NO. | SIZE | A | B | C | D | WEIGHT |
|---|---|---|---|---|---|---|
| WK-200035-040 | 3/8 mm | GCV10 (1-1/2") | 1,670 | 69mm | 62mm | 0,2 kg |
| WK-200035-008 | 51mm | GCV50 (2-1/2") | 2,220 | 79mm | 70mm | 0,3 kg |
| WK-200035-009 | 65mm (2-1/2") | GCV65 (2-1/2") | 1,00 | 79mm | 95mm | 0,3 kg |



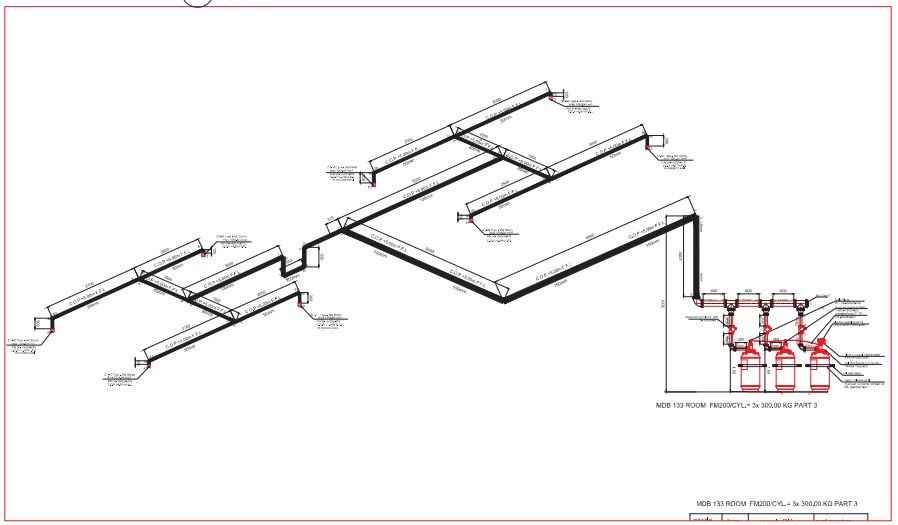

## MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS
N.T.S




## ELBOW PIPE ASSY. DETAILS
N.T.S

| MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS | |
|---|---|
| SN | DESCRIPTION |
| 1 | CYLINDER |
| 2 | BRACKET |
| 3 | CYLINDER VALVE |
| 4 | MANUAL LEVER |
| 5 | ELECTRIC CONTROL HEAD |
| 6 | PRESS. SWITCH |
| 7 | SUPERVISORY PRESS. SWITCH |
| 8 | LIQUID LEVEL INDICATOR |
| 9 | OUTLET VALVE ADAPTOR |
| 10 | UNION |
| 11 | MAINTENANCE SWITCH |
| 12 | JUNCTION BOX |
| 13 | FLEXIBLE EMT |

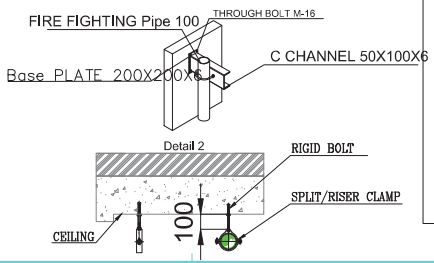
| HANGER SPACING DETAILS AS PER ANSI B31.1&MSS SP-58 | |
|---|---|
| PIPE SIZE mm (in) | HANGER SPACING M (ft) |
| 15 (1/2") | 2,4 (8ft) |
| 20 (3/4") | 2.7 (9ft) |
| 25 (1") | 2.7 (9ft) |
| 32 (1 1/4") | 2.7 (9ft) |
| 40 (1 1/2") | 3,7 (12ft) |
| 50 (2") | 4 (13ft) |
| 65 (2 1/2") | 4.3 (14ft) |
| 80 (3") | 4.6 (15ft) |
| 100 (4") | 5.2 (17ft) |



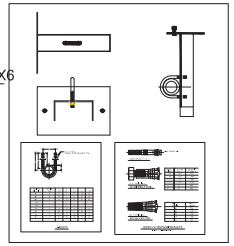

MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 3

## Pipe Support Details
N.T.S

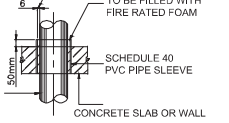
Detail 1 RIGID SUPPORT




Detail 1 RIGID SUPPORT



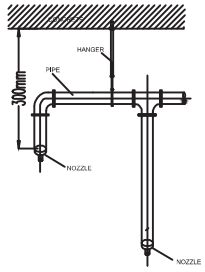
## ISOMETRIC VIEW
NTS


MIN. 6mm. RADIAL GAP BETWEEN PIPE & SLEEVE
6
TO BE FILLED WITH FIRE RATED FOAM
SCHEDULE 40 PVC PIPE SLEEVE
50mm
CONCRETE SLAB OR WALL

PIPE SLEEVE SCHEDULE:

| PIPE SIZE IN MM | SELLVE SIZE IN MM |
|---|---|
| 65 | 100 |
| 100 | 150 |

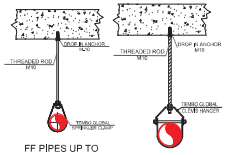
PIPE SLEEVE GENERAL







Detail 2


THREADED ROD M10
DROP IN ANCHOR M10
THREADED ROD M10
DROP IN ANCHOR M10
TRIMCO GLOBAL CLEVIS HANGER
TRIMCO GLOBAL CLEVIS HANGER
FF PIPES UP TO 50Ø
FF PIPE UP TO 150Ø

Client:
Ministry of Housing, Utilities & Urban Development
New Urban Communities Authority

Main Consultant:
dar
Dar Al-Handasah (Egypt)

Sub-Consultant:
SHAKER CONSULTING GROUP

Contractor:
中国机械设备工程股份有限公司
CHINA NATIONAL MACHINERY INDUSTRY CORPORATION

Project Name:
Central Business District Of the New Administrative Capital
CBD EAST • PHASE 1

Key Plan:
NORTH

Sub Contractor:
Mechanical Engineering Service & Consulting
mesc

NOTES / LEGEND:

| Legend | Symbol |
|---|---|
| FIRE FIGHTING AND ALARM CONTROL PANEL Model AFESP | F.F.C.P |
| ADDRESSABLE SMOKE DETECTOR Model DS-PR | |
| ADDRESSABLE HEAT DETECTOR Model DS-HFR | |
| FIRE BELL Model MBA-6-24 | |
| HORNS WITH FLASHER Model HSP-A | SF |
| GAS ABORT Model Kidde 878782 | A |
| MANUAL RELEASE Kidde 2000 | M |
| FM200 CYLINDER | |
| Valve Outlet Adapter 3/8" P/N WK-200035-040 | |
| Cylinder Supervisory switch P/N06-118260-001 | |
| Electric control Head 24 VDC P/N90-195015-030 | |
| Electric control Head Monitor P/N06-118260-001 | |
| FM200 Nozzle | |
| XDGS RELEASING MODULE ASM P/N 90-193030-031 | |
| XDGS OUTPUT RELAY MODULE AS P/N 90-193004-031 | |
| XDGS INPUT MONITOR MODULE AS P/N 90-197005-031 | |
| XDGS OUTPUT SIGNAL MODULE ASM P/N 90-193030-033 | |

Revision Table:

| No. | Description | Date | App. |
|---|---|---|---|
| 00 | FOR APPROVAL | 14 MAY 2022 | ETHAN |

Drawing Title:
CUC-E01 UTILITY BUILDING
FIRST FLOOR
MBD ROOM 1-133
FM200 SUPPRESSION SYSTEM

| Designed | Checked | Approved |
|---|---|---|
| GHNW | GHNW | ETHAN |
| Drawn: AJMED ALLAM | Date: 17 MAY 2022 | Scale: 1:100 |

| SHO | CSCEC | 17 | E01 | ME | FF | 04 | 01 | 01 | 0001 | 0002 | 01 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Contractor | Tender No. | Building No. | Discipline | Sub Discipline | Plan Type | Level No. | Sheet No. | Sheet No. | Sheet No. | Rev. No. |

KFS Hydraulic Flow Calculation Program v4.00 (HFC-227ea)
UL: EX4674 / Component of FM Approved System

File Name: FM200 calculation Report for E01-FirstFloor-MDB ROOM (133) PART2OF4 18-05-2023.FC4

## Consolidated Report

## Customer Information

Company Name: CSCEC
Address:

Phone:
Contact:
Title:

## Project Data

Project Name: CBD - (CUC) - E01
Designer: MESC
Number:
Account:
Location:
Description: Hydraulic calculation for MDB ROOM (133) PART2 OF4

## Enclosure Report

Elevation: 326 m (relative to sea level)
Atmospheric Correction Factor: 0.96 (NFPA 2001)

Enclosure 1 MDB ROOM (133) PART2 OF4

Enclosure Temperature:
Minimum: 21.0 C
Maximum: 40.0 C
Max. Concentration: 7.45% (At 40.0 C)
Design Concentration:

Number of Nozzles: 8
Width: 11.33 m
Length: 28.97 m
Height: 5.21 m
Volume: 1710.08 m ³

Calculation Date/Time: Thursday, May 18, 2023, 8:43:26 AM
Copyright (c) JENSEN HUGHES, Inc. Licensed to: Kidde-Fenwal
Key ID: 181643511

Kidde Fire Systems

## Consolidated Report

| | | | |
|---|---|---|---|
| Adjusted: | 7.00 % | Non-permeable: | 0.00 m ³ |
| Minimum: | 7.00 % | Total Volume: | 1710.08 m ³ |
| Min. Agent Required: | 899.33 kg | | |
| Adjusted Agent Required: | 900.00 kg | | |

## Agent Source Report

| | |
|---|---|
| Agent: | HFC-227ea |
| Cylinder Name: | 368 L Cylinder w/LLI |
| Cylinder Part Number: | 90-100901-001 |
| Agent Per Cylinder: | 300.00 kg |
| Fill Density: | 0.815 kg / l |
| Number of Main Cylinders: | 3 |
| Number of Reserve Cylinders: | 0 |
| Cylinder Empty Weight: | 229.10 kg |
| Weight, All Cylinders + Agent: | 1587.30 kg |
| Floor Area Per Cylinder: | 0.29 m ² |
| Floor Loading Per Cylinder: | 1824 kg /m ² |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Key ID: 181643511

Kidde Fire Systems

# Consolidated Report

## Parts Report

Total Agent Required: 900.00 kg

Cylinder Name: 368 L Cylinder w/LLI (Part: 90-100901-001)

Number of Cylinders: 3

| Nozzle | Type | Nozzle Diameter | Nozzle Area | Part Number |
|---|---|---|---|---|
| E1-N1 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |

| Pipe & Fittings | Type | Diameter | Length | Elbows (90) | Elbows (45) | Tees | Unions |
|---|---|---|---|---|---|---|---|
| | 40W | 50 mm | 22.20 m | 8 | 0 | 0 | 0 |
| | 40W | 80 mm | 8.70 m | 3 | 0 | 4 | 0 |
| | 40W | 100 mm | 10.62 m | 4 | 0 | 2 | 0 |
| | 40W | 150 mm | 8.80 m | 2 | 0 | 4 | 0 |

| Other Objects | Name | Quantity | Part Number |
|---|---|---|---|
| | 80 mm Swing Check Valve | 3 | 06-118058-001 |
| | End Cap | 1 | N/A |

## System Acceptance Report

Calculation Date/Time: Thursday, May 18, 2023, 8:43:26 AM

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Key ID: 181643511

Kidde Fire Systems

# Consolidated Report

System Discharge Time: 8.3 seconds
Percent Agent In Pipe: 57.0%
Percent Agent Before First Tee: 31.5%
Dead Volume: 0.0% (0.01 kg)

Enclosure Number: 1
Enclosure Name: MDB ROOM (133) PART2 OF4
Minimum Design Concentration: 7.00%
Adjusted Design Concentration: 7.00%
Predicted Concentration: 7.01%
Maximum Expected Agent Concentration: 7.45% (At 40.0 C)

Maximum Allowed Enclosure Pressure: 500.00 Pa
Estimated Free Vent Area Required (Negative): 0.60 $m^2$
Estimated Free Vent Area Required (Positive): 0.16 $m^2$
Installed Vent Area: 0.00 $m^2$
Predicted Enclosure Pressure (Negative): N/A
Predicted Enclosure Pressure (Positive): N/A
Maximum Enclosure Flow Rate: 136.14 kg/s

| Nozzle | Minimum Agent Required | Adjusted Agent Required | Predicted Agent Delivered | Average Nozzle Pressure |
|---|---|---|---|---|
| E1-N1 | 112.43 kg | 112.51 kg | 108.92 kg | 6.556 bar |
| E1-N2 | 112.42 kg | 112.50 kg | 111.40 kg | 6.762 bar |
| E1-N3 | 112.42 kg | 112.50 kg | 111.40 kg | 6.762 bar |
| E1-N4 | 112.42 kg | 112.50 kg | 108.92 kg | 6.556 bar |
| E1-N5 | 112.42 kg | 112.50 kg | 115.42 kg | 6.943 bar |
| E1-N6 | 112.42 kg | 112.50 kg | 114.26 kg | 6.848 bar |
| E1-N7 | 112.42 kg | 112.50 kg | 114.26 kg | 6.848 bar |
| E1-N8 | 112.41 kg | 112.49 kg | 115.42 kg | 6.943 bar |
| Total | 899.36 kg | 900.00 kg | 900.00 kg | |

Calculation Date/Time: Thursday, May 18, 2023, 8:43:26 AM
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Key ID: 181643511

# Consolidated Report

## Pipe Network Report

| Description | Pipe Section | Start Node | End Node | Pipe Type | Pipe Diameter | Pipe Length | Union | Total Elevation Change | Total Equivalent Length | Nozzle Name | Nozzle Size | Nozzle Type | Nozzle Area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cylinder - On | ManR. | 0 | 8 | | 80 mm | 1.50 m | 0 | 1.50 m | 15.24 m | | | | |
| Pipe | ManR. | 8 | 9 | 40W | 80 mm | 0.30 m | 0 | ------ | 0.30 m | | | | |
| Elbow (90) | ManR. | 9 | 10 | 40W | 80 mm | ------ | 0 | ------ | 1.25 m | | | | |
| Pipe | ManR. | 10 | 11 | 40W | 80 mm | 0.30 m | 0 | 0.30 m | 0.30 m | | | | |
| Check Valve -> | ManR. | 11 | 12 | | 80 mm | 0.24 m | 0 | 0.24 m | 3.96 m | | | | |
| Pipe | ManR. | 12 | 13 | 40W | 80 mm | 0.30 m | 0 | 0.30 m | 0.30 m | | | | |
| Tee | Man. | 13 | 14 | 40W | 150 mm | ------ | 0 | ------ | 6.16 m | | | | |
| Pipe | Man. | 14 | 15 | 40W | 150 mm | 0.60 m | 0 | ------ | 0.60 m | | | | |
| Tee | Man. | 15 | 16 | 40W | 150 mm | ------ | 0 | ------ | 2.01 m | | | | |
| Pipe | Man. | 16 | 17 | 40W | 150 mm | 0.60 m | 0 | ------ | 0.60 m | | | | |
| Tee | Man. | 17 | 18 | 40W | 150 mm | ------ | 0 | ------ | 2.01 m | | | | |
| Pipe | Man./End | 18 | 19 | 40W | 150 mm | 0.30 m | 0 | ------ | 0.30 m | | | | |
| Elbow (90) | System | 19 | 20 | 40W | 150 mm | ------ | 0 | ------ | 2.47 m | | | | |
| Pipe | System | 20 | 21 | 40W | 150 mm | 2.30 m | 0 | 2.30 m | 2.30 m | | | | |
| Elbow (90) | System | 21 | 22 | 40W | 150 mm | ------ | 0 | ------ | 2.47 m | | | | |
| Pipe | System | 22 | 23 | 40W | 150 mm | 5.00 m | 0 | ------ | 5.00 m | | | | |
| Tee | System | 23 | 24 | 40W | 100 mm | ------ | 0 | ------ | 4.08 m | | | | |
| Pipe | System | 24 | 25 | 40W | 100 mm | 0.37 m | 0 | ------ | 0.37 m | | | | |
| Elbow (90) | System | 25 | 26 | 40W | 100 mm | ------ | 0 | ------ | 1.65 m | | | | |
| Pipe | System | 26 | 27 | 40W | 100 mm | 0.30 m | 0 | -0.30 m | 0.30 m | | | | |
| Elbow (90) | System | 27 | 28 | 40W | 100 mm | ------ | 0 | ------ | 1.65 m | | | | |
| Pipe | System | 28 | 29 | 40W | 100 mm | 0.65 m | 0 | ------ | 0.65 m | | | | |
| Elbow (90) | System | 29 | 30 | 40W | 100 mm | ------ | 0 | ------ | 1.65 m | | | | |
| Pipe | System | 30 | 31 | 40W | 100 mm | 0.30 m | 0 | 0.30 m | 0.30 m | | | | |
| Elbow (90) | System | 31 | 32 | 40W | 100 mm | ------ | 0 | ------ | 1.65 m | | | | |
| Pipe | System | 32 | 33 | 40W | 100 mm | 4.00 m | 0 | ------ | 4.00 m | | | | |
| Tee | System | 33 | 34 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 34 | 35 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |
| Tee | System | 35 | 36 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 36 | 37 | 40W | 50 mm | 3.00 m | 0 | ------ | 3.00 m | | | | |
| Elbow (90) | System | 37 | 38 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 38 | 39 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N1 | 50 mm | 360° | 1354.84 mm $^2$ |

# Consolidated Report

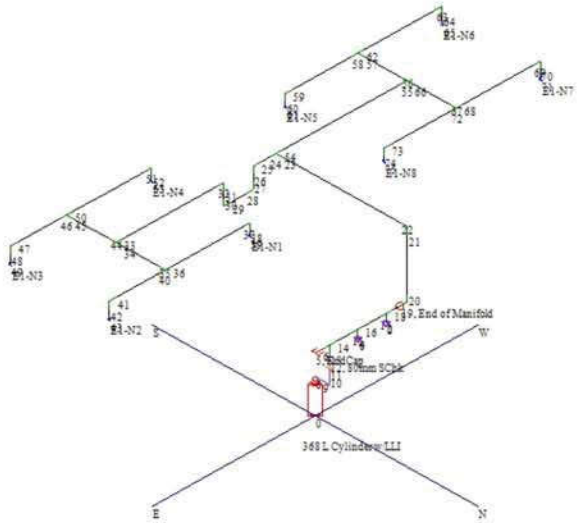
| Description | Pipe Section | Start Node | End Node | Pipe Type | Pipe Diameter | Pipe Length | Union | Total Elevation Change | Total Equivalent Length | Nozzle Name | Nozzle Size | Nozzle Type | Nozzle Area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tee | System | 35 | 40 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 40 | 41 | 40W | 50 mm | 1.80 m | 0 | ------ | 1.80 m | | | | |
| Elbow (90) | System | 41 | 42 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 42 | 43 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N2 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 33 | 44 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 44 | 45 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |
| Tee | System | 45 | 46 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 46 | 47 | 40W | 50 mm | 1.80 m | 0 | ------ | 1.80 m | | | | |
| Elbow (90) | System | 47 | 48 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 48 | 49 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N3 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 45 | 50 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 50 | 51 | 40W | 50 mm | 3.00 m | 0 | ------ | 3.00 m | | | | |
| Elbow (90) | System | 51 | 52 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 52 | 53 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N4 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 23 | 54 | 40W | 100 mm | ------ | 0 | ------ | 4.08 m | | | | |
| Pipe | System | 54 | 55 | 40W | 100 mm | 5.00 m | 0 | ------ | 5.00 m | | | | |
| Tee | System | 55 | 56 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 56 | 57 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |
| Tee | System | 57 | 58 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 58 | 59 | 40W | 50 mm | 2.50 m | 0 | ------ | 2.50 m | | | | |
| Elbow (90) | System | 59 | 60 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 60 | 61 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N5 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 57 | 62 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 62 | 63 | 40W | 50 mm | 3.00 m | 0 | ------ | 3.00 m | | | | |
| Elbow (90) | System | 63 | 64 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 64 | 65 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N6 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 55 | 66 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 66 | 67 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |
| Tee | System | 67 | 68 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 68 | 69 | 40W | 50 mm | 3.00 m | 0 | ------ | 3.00 m | | | | |
| Elbow (90) | System | 69 | 70 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 70 | 71 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N7 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 67 | 72 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |

# Consolidated Report

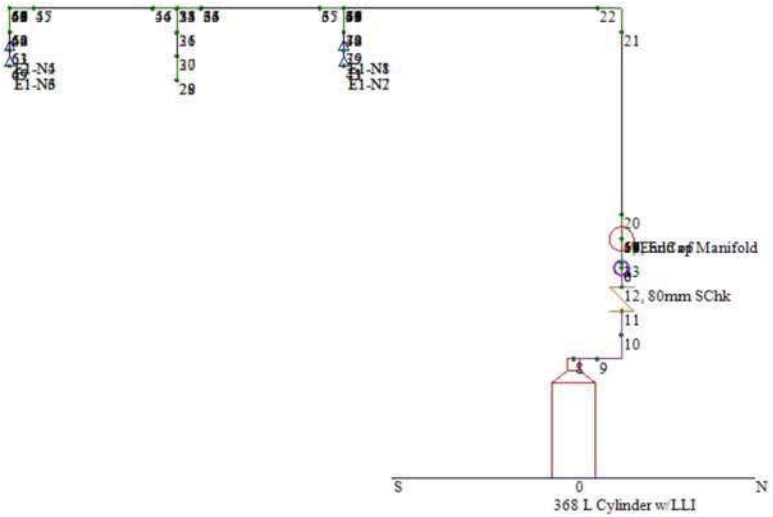
| Description | Pipe Section | Start Node | End Node | Pipe Type | Pipe Diameter | Pipe Length | Union | Total Elevation Change | Total Equivalent Length | Nozzle Name | Nozzle Size | Nozzle Type | Nozzle Area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pipe | System | 72 | 73 | 40W | 50 mm | 2.50 m | 0 | ------ | 2.50 m | | | | |
| Elbow (90) | System | 73 | 74 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 74 | 75 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N8 | 50 mm | 360° | 1354.84 mm $^2$ |
| Tee | Man. | 2 | 18 | 40W | 150 mm | ------ | 0 | ------ | 6.16 m | | | | |
| Cylinder + | Man. | 0 | 2 | 40W | 80 mm | 2.64 m | 0 | 2.34 m | 15.24 m | | | | |
| Tee | Man. | 4 | 16 | 40W | 150 mm | ------ | 0 | ------ | 6.16 m | | | | |
| Cylinder + | Man. | 0 | 4 | 40W | 80 mm | 2.64 m | 0 | 2.34 m | 15.24 m | | | | |
| Tee | Man. | 6 | 14 | 40W | 150 mm | ------ | 0 | ------ | 2.01 m | | | | |
| End Cap | Man. | 5 | 6 | 40W | 150 mm | 0.10 m | 0 | ------ | 999.00 m | | | | |

# Consolidated Report

View #: 1 - Isometric View-Node

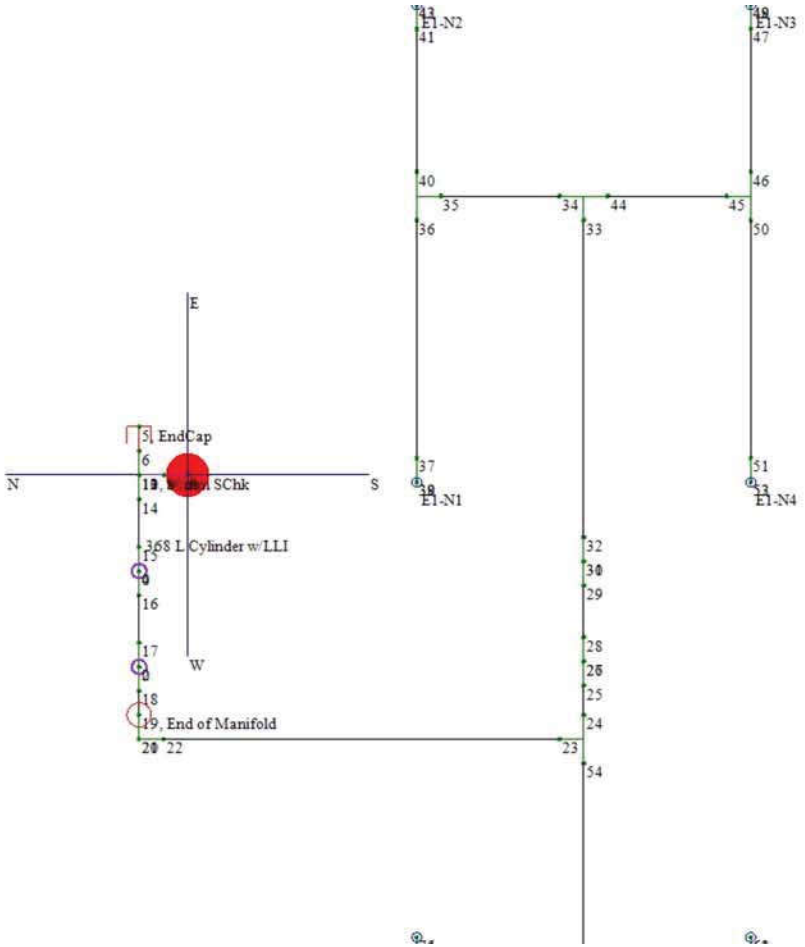


View #: 5 - Standard Elevation View

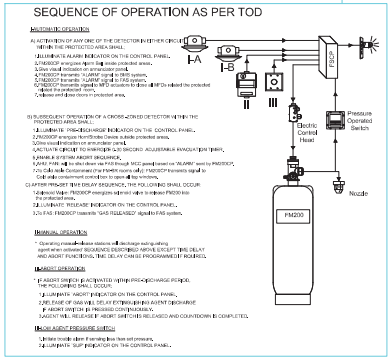


# Consolidated Report

View #: 9 - Standard Plan View



## SEQUENCE OF OPERATION AS PER TOD




AUTOMATIC OPERATION

A) ACTIVATION OF ANY ONE OF THE DETECTOR IN EITHER CIRCUIT WITHIN THE PROTECTED AREA SHALL :

1.ILLUMINATE ALARM INDICATOR ON THE CONTROL PANEL.
2.FM200CP energizes horn/strobe Device outside protected areas.
3.Give visual indication on annunciator panel.
4.FM200CP transmits "ALARM" signal to BMS system.
5.Give audible indication on annunciator panel.
6.FM200CP transmits signal to MPS instructing to close all MFDs related the protected space the protected room.
7.Release exit door doors in protected area.

B) SUBSEQUENT OPERATION OF A CROSS-ZONED DETECTOR WITHIN THE PROTECTED AREA SHALL :

1.ILLUMINATE PRE-DISCHARGE INDICATOR ON THE CONTROL PANEL.
2.FM200CP energizes horn/strobe Device outside protected areas.
3.Give visual indication on annunciator panel.
4.ACTIVATE CIRCUIT TO MAINTAIN 0-30 SECOND ADJUSTABLE ANNUNCIATION TIMER.
5.ANNUL SYSTEM ABORT SEQUENCE.
6.AND THEN will be also done via FAS through MCC panel based on "ALARM" sent by FM200CP.
7.To Cable tank Contained in the FM200 room is only if MDCP transmits signal to close inlet/outlet dampers and switches to open all fog nozzles.

CHAPTER PRESET TIME DELAY SEQUENCE, THE FOLLOWING SHALL OCCUR:

1.Solenoid Valve FM200CP energizes opened valve to release FM200 into the protected area.
2.ILLUMINATE RELEASE INDICATOR ON THE CONTROL PANEL.
3.A FAS FM200CP transmits "GAS RELEASED" signal to FAS system.

MANUAL OPERATION

- Operating manual pull station will discharge extinguishing agent when activated REGARDLESS ELECTRICITY ARTIVE (EXCEPT TIME DELAY AND ABORT FUNCTIONS, THAT DELAY CAN BE PROGRAMMED IF REQUIRED.

ABORT OPERATION

1) ABORT SWITCH IS ACTIVATED DURING PRE-DISCHARGE PERIOD, THE FOLLOWING SHALL OCCUR:
   1.a ILLUMINATE "ABORT" INDICATOR ON THE CONTROL PANEL.
   2.RELEASE OF GAS WILL DELAY EXTINGUISHING AGENT DISCHARGE
   3. ABORT SWITCH IS PRESSED CONTINUOUSLY.
   LASCENT WILL RELEASE IF ABORT SWITCHES RELEASED AND COUNTDOWN IS COMPLETED.

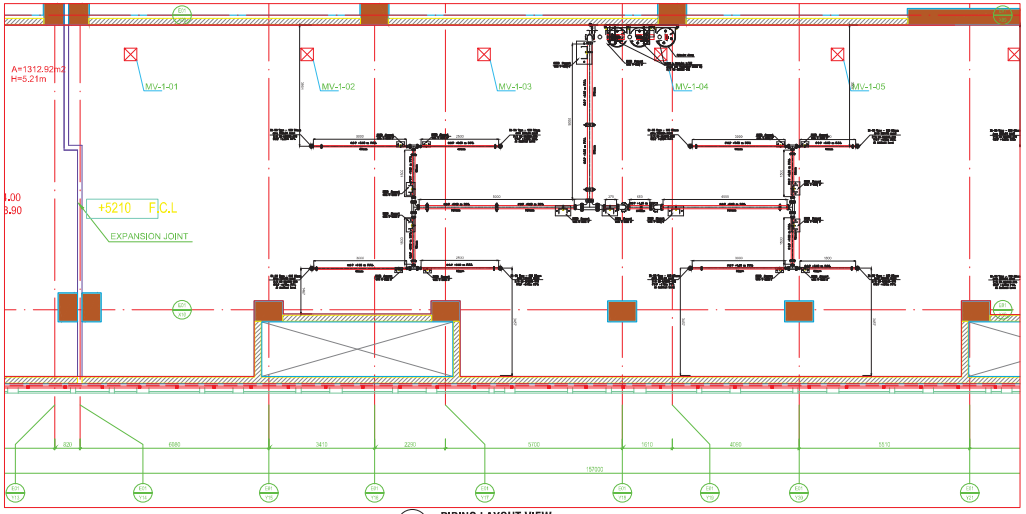
AGENT PRESSURE SWITCH

Cylinder bottle valve if sensing loss from set pressure.
1.a ILLUMINATE "SUPV" INDICATION ON THE CONTROL PANEL.

## MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 2

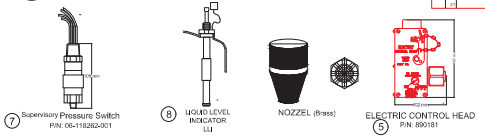
| nozzle | type | nozzle DIA | part number |
|---|---|---|---|
| E1-N1 | 360° | 50 mm | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 90-194028-578 |

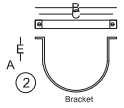
| SN | | QTY | MODEL NO. |
|---|---|---|---|
| 1 | MAIN CYLINDER WITH CYLINDER VALVE & LLI | 3 PCS | 90-193097-001 |
| 2 | CYLINDER STRAP | 3 PCS | |
| 3 | ELECTRICAL CONTROL HEAD | 1 PCS | 90-193019-001 |
| 4 | SUPERVISORY PRESSURE SWITCH | 3 PCS | 90-193021-001 |
| 5 | FIRE SUPPRESSION CONTROL PANEL | 1 PCS | MINI 2.0 |
| 6 | MULTI TONE HORN / STROBE | 1 PCS | MHS-A |
| 7 | MANUAL PULL STATION | 1 PCS | 90-193033-001 |
| 8 | ABORT SWITCH | 1 PCS | 90-193032-001 |
| 9 | PHOTO SMOKE DETECTOR | 48 PCS | 2351PS |
| 10 | HEAT DETECTOR | 48 PCS | 2351HTS |
| 11 | ALARM BELL 6" | 1 PCS | BELL-6-24 |
| 12 | PRESSURE OPERATED HEAD | 3 PCS | 90-193072-001 |
| 13 | Swing Check Valve 3" | 3 PCS | 90-193081-001 |
| 14 | Actuation hose 3" | 3 PCS | WK-204500-000 |
| 15 | Male Elbow 6" Npsm x 1/8" NPT | 3 PCS | WK-406006-000 |
| 16 | Male Connector 6" Nsm x 1/8" NPT | 3 PCS | WK-406020-010 |
| 17 | EDGE ARM MODULE | 1 PCS | 15-193030-001 |
| 18 | EDGE AC RELAY MODULE | 1 PCS | 4-406041-001 |
| 19 | EDGE ARMONITOR MODULE | 1 PCS | 4-411053-001 |
| 20 | DOOR RBM RELEASING MODULE | 1 PCS | 15-406030-001 |

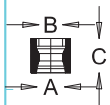



PIPING LAYOUT VIEW
Scale 1:100

## GENERAL COMPONENTS DETAILS
N.T.S

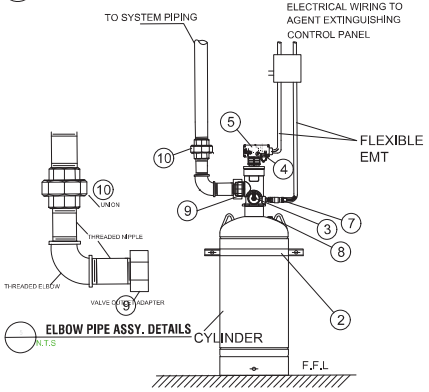



| VALVE OUTLET ADAPTORS | | | | | | | |
|---|---|---|---|---|---|---|---|
| PART NO. | dia | A | B | C | D | weight |
| 6R-63006-000 | 25mm | 60 KG (1-1/2") | 1.2/4 | 98mm | 63mm | 0.2 kg |
| 6R-63500-000 | 51mm | 60 KG (2-1/2") | 2.0/03 | 74mm | 76mm | 0.3 kg |
| 6R-63000-000 | 63mm (2X1) | 60 KG (3-1/2") | 3.00 | 79mm | 90mm | 0.5 kg |

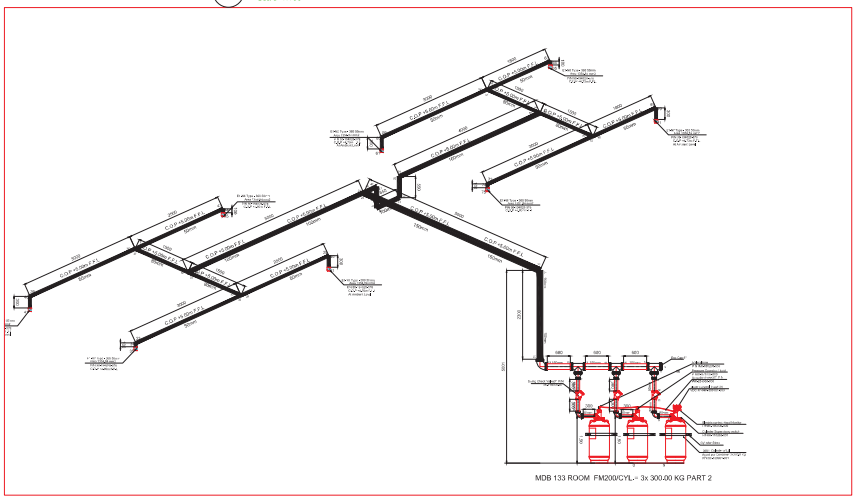
## MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS
N.T.S



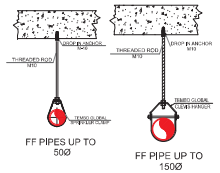

## ELBOW PIPE ASSY. DETAILS
N.T.S

| MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS | |
|---|---|
| SN | DESCRIPTION |
| 1 | CYLINDER |
| 2 | BRACKET |
| 3 | CYLINDER VALVE |
| 4 | MANUAL LEVER |
| 5 | ELECTRIC CONTROL HEAD |
| 6 | PRESS. SWITCH |
| 7 | SUPERVISORY PRESS. SWITCH |
| 8 | LIQUID LEVEL INDICATOR |
| 9 | OUTLET VALVE ADAPTOR |
| 10 | UNION |
| 11 | MAINTENANCE SWITCH |
| 12 | JUNCTION BOX |
| 13 | FLEXIBLE EMT |

| HANGER SPACING DETAILS AS PER ANSI B31.1&MSS SP-58 | |
|---|---|
| PIPE SIZE HANGER SPACING mm (in) | M (ft) |
| 15 (1/2") | 2.4 (8ft) |
| 20 (3/4") | 2.7 (9ft) |
| 25 (1") | 2.7 (9ft) |
| 32 (1 1/4") | 2.7 (9ft) |
| 40 (1 1/2") | 3.7 (12ft) |
| 50 (2") | 4 (13ft) |
| 65 (2 1/2") | 4.3 (14ft) |
| 80 (3") | 4.6 (15ft) |
| 100 (4") | 5.2 (17ft) |

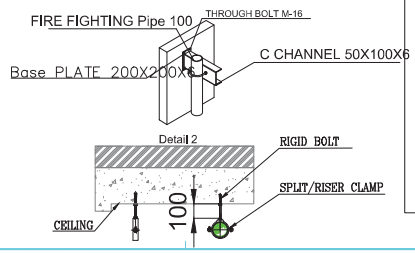



Detail 2

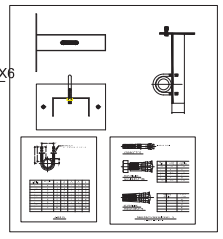



## Pipe Support Details
N.T.S

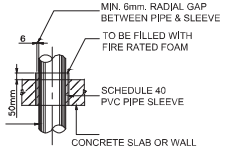
Detail 1 RIGID SUPPORT




Detail 1 RIGID SUPPORT



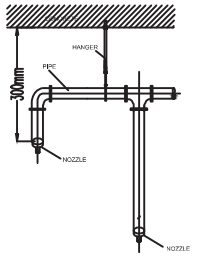
## ISOMETRIC VIEW
NTS


MIN. 6mm, RADIAL GAP BETWEEN PIPE & SLEEVE
TO BE FILLED WITH FIRE RATED FOAM
SCHEDULE 40 PVC PIPE SLEEVE
CONCRETE SLAB OR WALL
6
50mm

PIPE SLEEVE SCHEDULE:

| PIPE SIZE IN MM | SELLVE SIZE IN MM |
|---|---|
| 65 | 100 |
| 100 | 150 |

PIPE SLEEVE GENERAL




Client:
Ministry of Housing, Utilities & Urban Development
New Urban Communities Authority

Main Consultant:
dar

Sub-Consultant:
SHAKER

Contractor:

Project Name:
Central Business District Of the New Administrative Capital
CBD EAST • PHASE 1

Key Plan:
NORTH

Sub Contractor:
Mechanical Engineering Service & Consulting
mesc

NOTES / LEGEND:

| Legend | Symbol |
|---|---|
| FIRE FIGHTING AND ALARM CONTROL PANEL Model ASENS | F.F.C.P |
| ADDRESSABLE SMOKE DETECTOR Model DP-PH | |
| ADDRESSABLE HEAT DETECTOR Model DP-HTH | |
| FIRE BELL Model BELL-6-24 | |
| STROBE WITH PLANTER Model STR-A | ST |
| Call ASSIST Model Elder SYSTEMS | A |
| MANUAL RELEASE Slide 2000 | M |
| FM200 CYLINDER | |
| Valve Outlet Adapter 90° P/N 63-000000-000 | |
| Cylinder Supervisory switch P/N00-100000-000 | |
| Electric control Head 24 VDC P/N90-000000-000 | |
| Electric control Head Heater P/N00-100000-000 | |
| FM200 Nozzle | |
| ZONES RELEASING MODULE RBM P/N 90-000000-000 | |
| ZONE OUTPUT RELAY MODULE AC P/N 90-000000-000 | |
| ZONE INPUT MONITOR MODULE AC P/N 90-000000-000 | |
| ZONE OUTPUT SIGNAL MODULE AOM P/N 90-000000-000 | |

Revision Table:

| No. | Description | Date | App. |
|---|---|---|---|
| 00 | FOR APPROVAL | 14 MAY 2022 | BTH/AK |

Drawing Title:
CUC-E01 UTILITY BUILDING
FIRST FLOOR
MBD ROOM 1-133
FM200 SUPPRESSION SYSTEM

| Designed | Checked | Approved |
|---|---|---|
| SAMIR | OMAR | BTH/AK |
| Drawn | Date | Scale |
| AJIBO ALLAH | 17 MAY 2022 | 1:100 |

| SHO | CSCEC | 17 | E01 | ME | FF | 04 | 01 | 01 | 0001 | 0002 | 01 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Contractor | Facility No. | Building Code | Discipline | Drawing Type | Drawing Sub-Type | Drawing Level | Drawing Area | Drawing Sheet No. | Drawing Sequence No. | Revision No. |

KFS Hydraulic Flow Calculation Program v4.00 (HFC-227ea)
UL: EX4674 / Component of FM Approved System

File Name: FM200 calculation Report for E01-FirstFloor-MDB ROOM (133) PART3OF4 18-05-2023.FC4

## Consolidated Report

## Customer Information

Company Name: CSCEC
Address:

Phone:
Contact:
Title:

## Project Data

Project Name: CBD - (CUC) - E01
Designer: MESC
Number:
Account:
Location:
Description: Hydraulic calculation for MDB ROOM (133) PART3 OF4

## Enclosure Report

Elevation: 326 m (relative to sea level)
Atmospheric Correction Factor: 0.96 (NFPA 2001)

Enclosure 1 MDB ROOM (133) PART3 OF4

Enclosure Temperature:
Minimum: 21.0 C
Maximum: 40.0 C
Max. Concentration: 7.45% (At 40.0 C)
Design Concentration:

Number of Nozzles: 8
Width: 11.33 m
Length: 28.97 m
Height: 5.21 m
Volume: 1710.08 m ³

Calculation Date/Time: Thursday, May 18, 2023, 8:40:39 AM
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Key ID: 181643511

Kidde Fire Systems

## Consolidated Report

| | | | |
|---|---|---|---|
| Adjusted: | 7.00 % | Non-permeable: | 0.00 m ³ |
| Minimum: | 7.00 % | Total Volume: | 1710.08 m ³ |
| Min. Agent Required: | 899.33 kg | | |
| Adjusted Agent Required: | 900.00 kg | | |

## Agent Source Report

| | |
|---|---|
| Agent: | HFC-227ea |
| Cylinder Name: | 368 L Cylinder w/LLI |
| Cylinder Part Number: | 90-100901-001 |
| Agent Per Cylinder: | 300.00 kg |
| Fill Density: | 0.815 kg / l |
| Number of Main Cylinders: | 3 |
| Number of Reserve Cylinders: | 0 |
| Cylinder Empty Weight: | 229.10 kg |
| Weight, All Cylinders + Agent: | 1587.30 kg |
| Floor Area Per Cylinder: | 0.29 m ² |
| Floor Loading Per Cylinder: | 1824 kg /m ² |


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Key ID: 181643511

Kidde Fire Systems

# Consolidated Report

## Parts Report

Total Agent Required: 900.00 kg

Cylinder Name: 368 L Cylinder w/LLI (Part: 90-100901-001)

Number of Cylinders: 3

| Nozzle | Type | Nozzle Diameter | Nozzle Area | Part Number |
|---|---|---|---|---|
| E1-N1 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |

| Pipe & Fittings | Type | Diameter | Length | Elbows (90) | Elbows (45) | Tees | Unions |
|---|---|---|---|---|---|---|---|
| | 40W | 50 mm | 22.00 m | 8 | 0 | 0 | 0 |
| | 40W | 80 mm | 8.70 m | 3 | 0 | 4 | 0 |
| | 40W | 100 mm | 10.95 m | 4 | 0 | 2 | 0 |
| | 40W | 150 mm | 14.80 m | 3 | 0 | 4 | 0 |

| Other Objects | Name | Quantity | Part Number |
|---|---|---|---|
| | 80 mm Swing Check Valve | 3 | 06-118058-001 |
| | End Cap | 1 | N/A |

## System Acceptance Report

Calculation Date/Time: Thursday, May 18, 2023, 8:40:39 AM

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Key ID: 181643511

Kidde Fire Systems

# Consolidated Report

| | |
|---|---|
| System Discharge Time: | 8.9 seconds |
| Percent Agent In Pipe: | 74.8% |
| Percent Agent Before First Tee: | 48.9% |
| Dead Volume: | 0.0% (0.01 kg) |

| | |
|---|---|
| Enclosure Number: | 1 |
| Enclosure Name: | MDB ROOM (133) PART3 OF4 |
| Minimum Design Concentration: | 7.00% |
| Adjusted Design Concentration: | 7.00% |
| Predicted Concentration: | 7.01% |
| Maximum Expected Agent Concentration: | 7.45% (At 40.0 C) |

| | |
|---|---|
| Maximum Allowed Enclosure Pressure: | 500.00 Pa |
| Estimated Free Vent Area Required (Negative): | 0.56 $m^2$ |
| Estimated Free Vent Area Required (Positive): | 0.14 $m^2$ |
| Installed Vent Area: | 0.00 $m^2$ |
| Predicted Enclosure Pressure (Negative): | N/A |
| Predicted Enclosure Pressure (Positive): | N/A |
| Maximum Enclosure Flow Rate: | 124.20 kg/s |

| Nozzle | Minimum Agent Required | Adjusted Agent Required | Predicted Agent Delivered | Average Nozzle Pressure |
|---|---|---|---|---|
| E1-N1 | 112.43 kg | 112.51 kg | 115.57 kg | 6.462 bar |
| E1-N2 | 112.42 kg | 112.50 kg | 114.14 kg | 6.367 bar |
| E1-N3 | 112.42 kg | 112.50 kg | 114.14 kg | 6.367 bar |
| E1-N4 | 112.42 kg | 112.50 kg | 115.57 kg | 6.462 bar |
| E1-N5 | 112.42 kg | 112.50 kg | 111.05 kg | 6.240 bar |
| E1-N6 | 112.42 kg | 112.50 kg | 109.24 kg | 6.075 bar |
| E1-N7 | 112.42 kg | 112.50 kg | 109.24 kg | 6.075 bar |
| E1-N8 | 112.41 kg | 112.49 kg | 111.05 kg | 6.240 bar |
| Total | 899.36 kg | 900.00 kg | 900.00 kg | |

Calculation Date/Time: Thursday, May 18, 2023, 8:40:39 AM

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Key ID: 181643511

# Consolidated Report

## Pipe Network Report

| Description | Pipe Section | Start Node | End Node | Pipe Type | Pipe Diameter | Pipe Length | Union | Total Elevation Change | Total Equivalent Length | Nozzle Name | Nozzle Size | Nozzle Type | Nozzle Area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cylinder - On | ManR. | 0 | 8 | | 80 mm | 1.50 m | 0 | 1.50 m | 15.24 m | | | | |
| Pipe | ManR. | 8 | 9 | 40W | 80 mm | 0.30 m | 0 | ------ | 0.30 m | | | | |
| Elbow (90) | ManR. | 9 | 10 | 40W | 80 mm | ------ | 0 | ------ | 1.25 m | | | | |
| Pipe | ManR. | 10 | 11 | 40W | 80 mm | 0.30 m | 0 | 0.30 m | 0.30 m | | | | |
| Check Valve -> | ManR. | 11 | 12 | | 80 mm | 0.24 m | 0 | 0.24 m | 3.96 m | | | | |
| Pipe | ManR. | 12 | 13 | 40W | 80 mm | 0.30 m | 0 | 0.30 m | 0.30 m | | | | |
| Tee | Man. | 13 | 14 | 40W | 150 mm | ------ | 0 | ------ | 6.16 m | | | | |
| Pipe | Man. | 14 | 15 | 40W | 150 mm | 0.60 m | 0 | ------ | 0.60 m | | | | |
| Tee | Man. | 15 | 16 | 40W | 150 mm | ------ | 0 | ------ | 2.01 m | | | | |
| Pipe | Man. | 16 | 17 | 40W | 150 mm | 0.60 m | 0 | ------ | 0.60 m | | | | |
| Tee | Man. | 17 | 18 | 40W | 150 mm | ------ | 0 | ------ | 2.01 m | | | | |
| Pipe | Man./End | 18 | 19 | 40W | 150 mm | 0.30 m | 0 | ------ | 0.30 m | | | | |
| Elbow (90) | System | 19 | 20 | 40W | 150 mm | ------ | 0 | ------ | 2.47 m | | | | |
| Pipe | System | 20 | 21 | 40W | 150 mm | 2.30 m | 0 | 2.30 m | 2.30 m | | | | |
| Elbow (90) | System | 21 | 22 | 40W | 150 mm | ------ | 0 | ------ | 2.47 m | | | | |
| Pipe | System | 22 | 23 | 40W | 150 mm | 6.00 m | 0 | ------ | 6.00 m | | | | |
| Elbow (90) | System | 23 | 24 | 40W | 150 mm | ------ | 0 | ------ | 2.47 m | | | | |
| Pipe | System | 24 | 25 | 40W | 150 mm | 5.00 m | 0 | ------ | 5.00 m | | | | |
| Tee | System | 25 | 26 | 40W | 100 mm | ------ | 0 | ------ | 4.08 m | | | | |
| Pipe | System | 26 | 27 | 40W | 100 mm | 5.00 m | 0 | ------ | 5.00 m | | | | |
| Tee | System | 27 | 28 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 28 | 29 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |
| Tee | System | 29 | 30 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 30 | 31 | 40W | 50 mm | 2.50 m | 0 | ------ | 2.50 m | | | | |
| Elbow (90) | System | 31 | 32 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 32 | 33 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N1 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 29 | 34 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 34 | 35 | 40W | 50 mm | 3.00 m | 0 | ------ | 3.00 m | | | | |
| Elbow (90) | System | 35 | 36 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 36 | 37 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N2 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 27 | 38 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 38 | 39 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |

# Consolidated Report

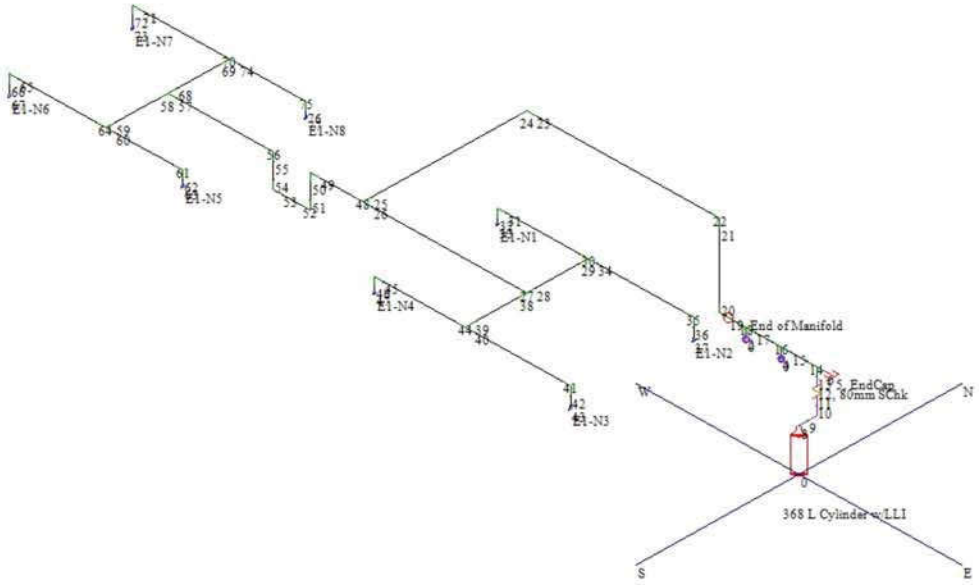
| Description | Pipe Section | Start Node | End Node | Pipe Type | Pipe Diameter | Pipe Length | Union | Total Elevation Change | Total Equivalent Length | Nozzle Name | Nozzle Size | Nozzle Type | Nozzle Area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tee | System | 39 | 40 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 40 | 41 | 40W | 50 mm | 3.00 m | 0 | ------ | 3.00 m | | | | |
| Elbow (90) | System | 41 | 42 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 42 | 43 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N3 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 39 | 44 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 44 | 45 | 40W | 50 mm | 2.50 m | 0 | ------ | 2.50 m | | | | |
| Elbow (90) | System | 45 | 46 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 46 | 47 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N4 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 25 | 48 | 40W | 100 mm | ------ | 0 | ------ | 4.08 m | | | | |
| Pipe | System | 48 | 49 | 40W | 100 mm | 1.20 m | 0 | ------ | 1.20 m | | | | |
| Elbow (90) | System | 49 | 50 | 40W | 100 mm | ------ | 0 | ------ | 1.65 m | | | | |
| Pipe | System | 50 | 51 | 40W | 100 mm | 0.55 m | 0 | -0.55 m | 0.55 m | | | | |
| Elbow (90) | System | 51 | 52 | 40W | 100 mm | ------ | 0 | ------ | 1.65 m | | | | |
| Pipe | System | 52 | 53 | 40W | 100 mm | 0.65 m | 0 | ------ | 0.65 m | | | | |
| Elbow (90) | System | 53 | 54 | 40W | 100 mm | ------ | 0 | ------ | 1.65 m | | | | |
| Pipe | System | 54 | 55 | 40W | 100 mm | 0.55 m | 0 | 0.55 m | 0.55 m | | | | |
| Elbow (90) | System | 55 | 56 | 40W | 100 mm | ------ | 0 | ------ | 1.65 m | | | | |
| Pipe | System | 56 | 57 | 40W | 100 mm | 3.00 m | 0 | ------ | 3.00 m | | | | |
| Tee | System | 57 | 58 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 58 | 59 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |
| Tee | System | 59 | 60 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 60 | 61 | 40W | 50 mm | 2.00 m | 0 | ------ | 2.00 m | | | | |
| Elbow (90) | System | 61 | 62 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 62 | 63 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N5 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 59 | 64 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 64 | 65 | 40W | 50 mm | 2.70 m | 0 | ------ | 2.70 m | | | | |
| Elbow (90) | System | 65 | 66 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 66 | 67 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N6 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 57 | 68 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 68 | 69 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |
| Tee | System | 69 | 70 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 70 | 71 | 40W | 50 mm | 2.70 m | 0 | ------ | 2.70 m | | | | |
| Elbow (90) | System | 71 | 72 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |

# Consolidated Report

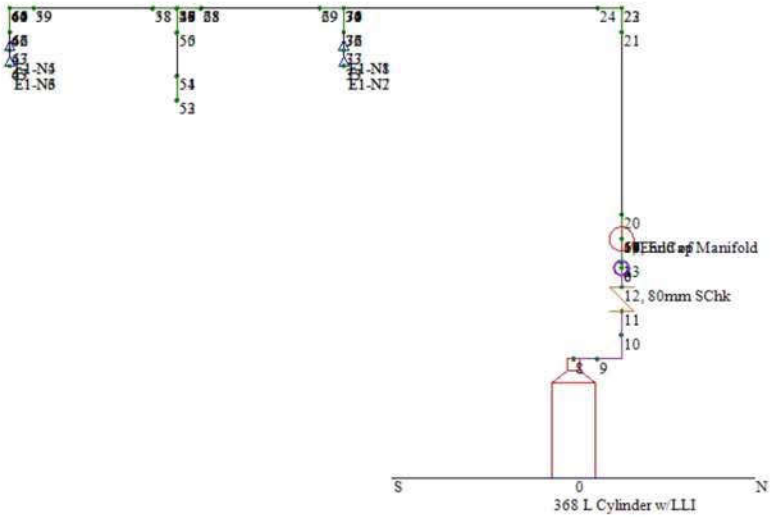
| Description | Pipe Section | Start Node | End Node | Pipe Type | Pipe Diameter | Pipe Length | Union | Total Elevation Change | Total Equivalent Length | Nozzle Name | Nozzle Size | Nozzle Type | Nozzle Area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pipe&Nozzle | System | 72 | 73 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N7 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 69 | 74 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 74 | 75 | 40W | 50 mm | 2.00 m | 0 | ------ | 2.00 m | | | | |
| Elbow (90) | System | 75 | 76 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 76 | 77 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N8 | 50 mm | 360° | 1354.84 mm ² |
| Tee | Man. | 2 | 18 | 40W | 150 mm | ------ | 0 | ------ | 6.16 m | | | | |
| Cylinder + | Man. | 0 | 2 | 40W | 80 mm | 2.64 m | 0 | 2.34 m | 15.24 m | | | | |
| Tee | Man. | 4 | 16 | 40W | 150 mm | ------ | 0 | ------ | 6.16 m | | | | |
| Cylinder + | Man. | 0 | 4 | 40W | 80 mm | 2.64 m | 0 | 2.34 m | 15.24 m | | | | |
| Tee | Man. | 6 | 14 | 40W | 150 mm | ------ | 0 | ------ | 2.01 m | | | | |
| End Cap | Man. | 5 | 6 | 40W | 150 mm | 0.10 m | 0 | ------ | 999.00 m | | | | |

# Consolidated Report

View #: 1 - Isometric View-Node

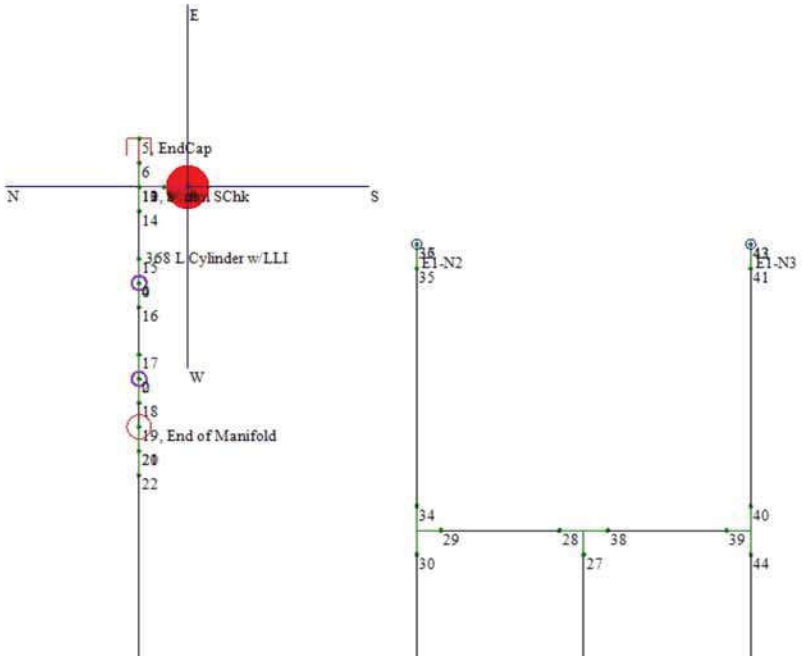


View #: 5 - Standard Elevation View

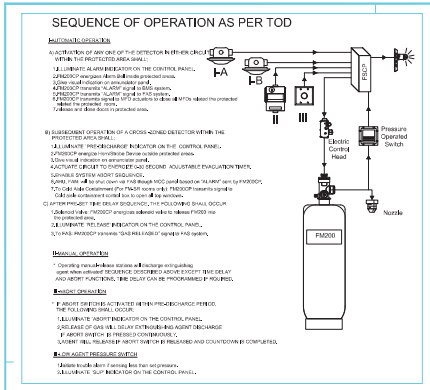


# Consolidated Report

View #: 9 - Standard Plan View



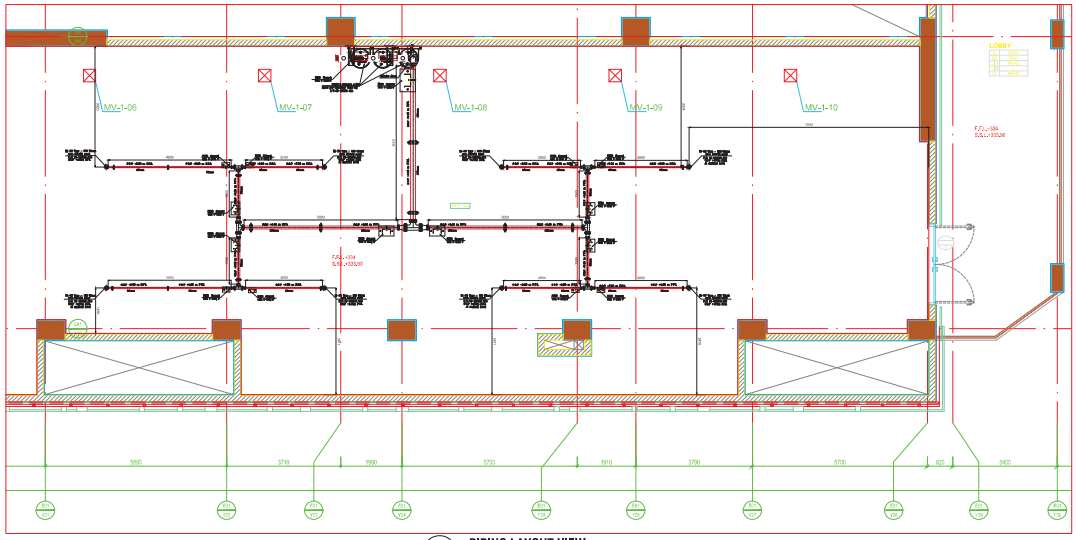
## SEQUENCE OF OPERATION AS PER TOD




MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 1

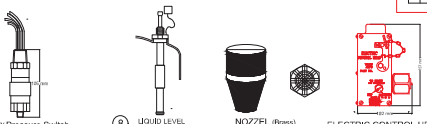
| nozzle | type | nozzle DIA | part number |
|---|---|---|---|
| E1-N1 | 360° | 50 mm | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 90-194028-578 |

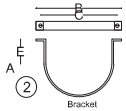
| SN | DESCRIPTION | QTY | MODEL NO. |
|---|---|---|---|
| 1 | MAIN CYLINDER WITH CYLINDER VALVE & LLI | 3 PCS | 06-118961-101 |
| 2 | CYLINDER STRAP | 3 PCS | |
| 3 | ELECTRICAL CONTROL HEAD | 3 PCS | 06-118610-003 |
| 4 | SUPERVISORY PRESSURE SWITCH | 3 PCS | 06-118262-001 |
| 5 | FIRE SUPPRESSION CONTROL PANEL | 1 PCS | AREB 2J2 |
| 6 | MULTI TONE HORN / STROBE | 1 PCS | 4189-5 |
| 7 | MANUAL PULL STATION | 1 PCS | 04-283000-001 |
| 8 | ABORT SWITCH | 1 PCS | 04-278702-010 |
| 9 | PHOTO SMOKE DETECTOR | 48 PCS | D5-4P5 |
| 10 | HEAT DETECTOR | 48 PCS | 5304P-S |
| 11 | ALARM BELL 6" | 1 PCS | 4906-9101 |
| 12 | PRESSURE OPERATED HEAD | 3 PCS | 04-278702-003 |
| 13 | Swing Check Valve 3" | 3 PCS | 06-118956-001 |
| 14 | Actuation hose 3" | 2 PCS | WK-2818B-S000 |
| 15 | Male Elbow 90° 15mm x 1/2" NPT | 3 PCS | WK-2818S5-S00 |
| 16 | Male Connector 90° 15mm x 1/2" NPT | 3 PCS | WK-2818S5-S010 |
| 17 | NODE ASH MODULE | 2 PCS | 754-203004-003 |
| 18 | NODE AO RELAY MODULE | 3 PCS | 754-203004-001 |
| 19 | NODE AI MONITOR MODULE | 1 PCS | 754-117004-001 |
| 20 | NODE RRH RELEASING MODULE | 1 PCS | 754-203004-001 |
| 21 | | | |

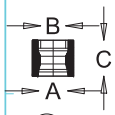



### PIPING LAYOUT VIEW
Scale 1:100

## GENERAL COMPONENTS DETAILS
N.T.S



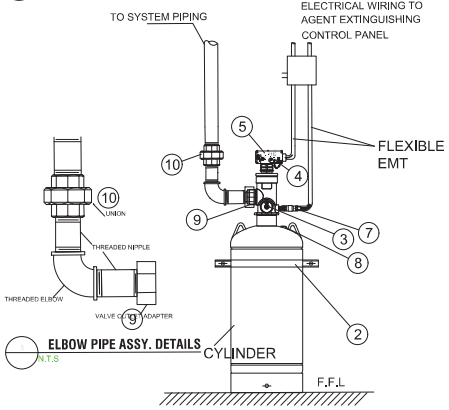




VALVE OUTLET ADAPTORS

| PART NO. | DIA | A | B | C | D | WEIGHT |
|---|---|---|---|---|---|---|
| WK-2839N5-S00 | 51mm | GOOWH (1"x2") | 5,970 | 69mm | 93mm | 0.2 kg |
| WK-2839D5-S00 | 51mm | GOO90 (2x2") | 6,000 | 76mm | 79mm | 0.3 kg |
| WK-2839W5-S00 | 66mm (2½") | GOO90 (2x2") | 5,000 | 76mm | 99mm | 0.5 kg |

## MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS
N.T.S

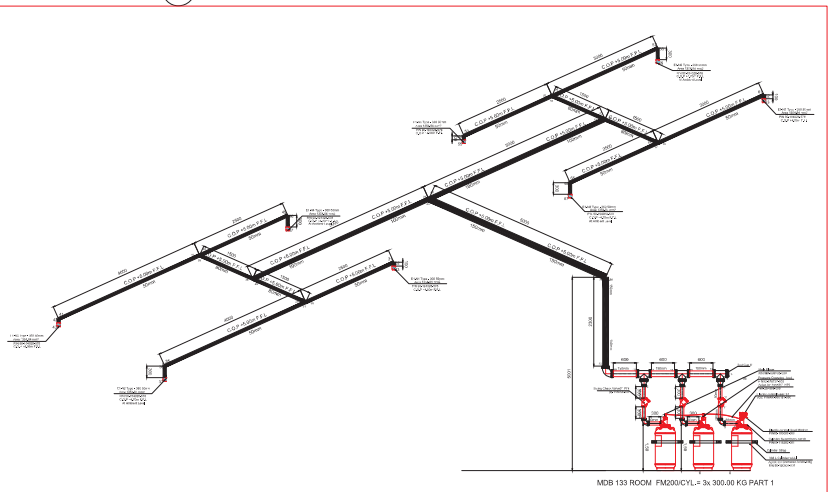



### MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS

| SN | DESCRIPTION |
|---|---|
| 1 | CYLINDER |
| 2 | BRACKET |
| 3 | CYLINDER VALVE |
| 4 | MANUAL LEVER |
| 5 | ELECTRIC CONTROL HEAD |
| 6 | PRESS. SWITCH |
| 7 | SUPERVISORY PRESS. SWITCH |
| 8 | LIQUID LEVEL INDICATOR |
| 9 | OUTLET VALVE ADAPTOR |
| 10 | UNION |
| 11 | MAINTENANCE SWITCH |
| 12 | JUNCTION BOX |
| 13 | FLEXIBLE EMT |

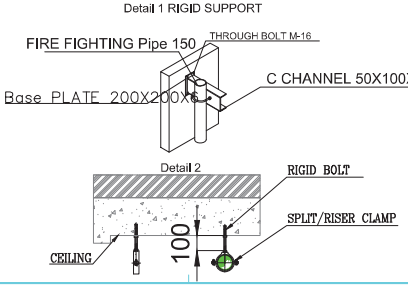
### HANGER SPACING DETAILS AS PER ANSI B31.1&MSS SP-58

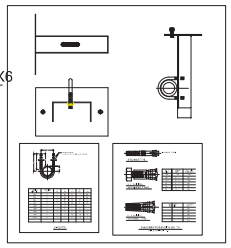
| PIPE SIZE mm (in) | HANGER SPACING M (ft) |
|---|---|
| 15 (1/2") | 2.4 (8ft) |
| 20 (3/4") | 2.7 (9ft) |
| 25 (1") | 2.7 (9ft) |
| 32 (1 1/4") | 2.7 (9ft) |
| 40 (1 1/2") | 3.7 (12ft) |
| 50 (2") | 4 (13ft) |
| 65 (2 1/2") | 4.3 (14ft) |
| 80 (3") | 4.6 (15ft) |
| 100 (4") | 5.2 (17ft) |



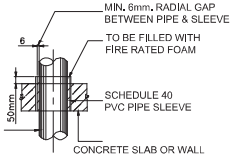

## ELBOW PIPE ASSY. DETAILS
N.T.S

## Pipe Support Detalis
N.T.S



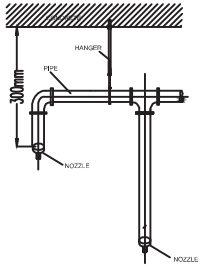

## ISOMETRIC VIEW
NTS


MIN. 6mm. RADIAL GAP BETWEEN PIPE & SLEEVE
TO BE FILLED WITH FIRE RATED FOAM
SCHEDULE 40 PVC PIPE SLEEVE
CONCRETE SLAB OR WALL
50mm
6

PIPE SLEEVE SCHEDULE:

| PIPE SIZE IN MM | SELLVE SIZE IN MM |
|---|---|
| 65 | 100 |
| 100 | 150 |

PIPE SLEEVE GENERAL




Client:
Ministry of Housing, Utilities & Urban Development
New Urban Communities Authority

Main Consultant:
dar Dar Al-Handasah (Egypt)

Sub-Consultant:
SHAKER CONSULTING GROUP

Contractor:

Project Name:
Central Business District Of the New Administrative Capital
CBD EAST • PHASE 1

Key Plan:
NORTH

Sub Contractor:
Mechanical Engineering Service & Consulting
mesc

NOTES / LEGEND:

| Legend | Symbol |
|---|---|
| FIRE FIGHTING AND ALARM CONTROL PANEL Model AREB | F.F.C.P |
| ADDRESSABLE IONIZE DETECTOR Model DI-PH | |
| ADDRESSABLE HEAT DETECTOR Model DF-HPH | |
| FIRE BELL Model MBK-6-24 | |
| STROBE WITH FLASHER Model SSR-A | SF |
| GAS ABORT Model Kidde 878768 | A |
| MANUAL RELEASE Kidde 3000 | M |
| FM200 CYLINDER | |
| Valve Outlet Adapter 54" P/N WK-2839N5-S00 | |
| Cylinder Supervisory switch P/NPS-120000-001 | |
| Electric control Head 24 VDC P/NVK-890181-000 | |
| Electric control Head Kombat P/NBK-100000-000 | |
| FM200 Nozzle | |
| NODE RELEASING MODULE RRH P/N 754-203004-001 | |
| NODE OUTPUT RELAY MODULE AO P/N 754-203004-001 | |
| NODE INPUT MONITOR MODULE AI P/N 754-117004-001 | |
| NODE OUTPUT SIGNAL MODULE ASH P/N 754-203004-003 | |

Reference Table:

| Type | No. | Ref. No. | Date |
|---|---|---|---|
| Drawings | 09 | E1B0864100D4TC-1430645-1000074001101 | 31/03/2019 |
| Documents | | | |

Coordination Table:

| Discipline | Signature | Date |
|---|---|---|
| Architecture | | |
| Structure S. | | 29 APR 2022 |
| Structure S. | | 29 APR 2022 |
| Mechanical | | |
| Plumbing | | 29 APR 2022 |
| HVAC | | |
| Other | | 29 APR 2022 |

Revision Table:

| No. | Description | Date | App. |
|---|---|---|---|
| 03 | FOR APPROVAL | 14 MAY 2022 | ETHIAN |

Drawing Title:
CUC-E01 UTILITY BUILDING
FIRST FLOOR
MBD ROOM 1-133
FM200 SUPPRESSION SYSTEM

| Designed | Checked | Approved |
|---|---|---|
| SHARY | SHARY | ETHIAN |
| Drawn | Date | Scale |
| AJMD ALLAM | 17 MAY 2022 | 1:100 |

SHD CSCEC 17 E01 ME FF 04 01 01 0001 0002 01
Type Contractor Packs No. Rubs Type Discip. Sub Discip. Floor Type Level Num. No. Sheet No. Req.ment No. Rev. No.

KFS Hydraulic Flow Calculation Program v4.00 (HFC-227ea)
UL: EX4674 / Component of FM Approved System

File Name: FM200 calculation Report for E01-FirstFloor-MDB ROOM (133) PART4OF4 18-05-2023.FC4

## Consolidated Report

## Customer Information

Company Name: CSCEC
Address:

Phone:
Contact:
Title:

## Project Data

Project Name: CBD - (CUC) - E01
Designer: MESC
Number:
Account:
Location:
Description: Hydraulic calculation for MDB ROOM (133) PART4 OF4

## Enclosure Report

Elevation: 326 m (relative to sea level)
Atmospheric Correction Factor: 0.96 (NFPA 2001)

Enclosure 1 MDB ROOM (133) PART4 OF4

Enclosure Temperature:
Minimum: 21.0 C
Maximum: 40.0 C
Max. Concentration: 7.45% (At 40.0 C)
Design Concentration:

Number of Nozzles: 8
Width: 11.33 m
Length: 28.97 m
Height: 5.21 m
Volume: 1710.08 m ³

Calculation Date/Time: Thursday, May 18, 2023, 8:35:35 AM
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Key ID: 181643511

Kidde Fire Systems

## Consolidated Report

| | | | |
|---|---|---|---|
| Adjusted: | 7.00 % | Non-permeable: | 0.00 m ³ |
| Minimum: | 7.00 % | Total Volume: | 1710.08 m ³ |
| Min. Agent Required: | 899.33 kg | | |
| Adjusted Agent Required: | 900.00 kg | | |

## Agent Source Report

| | |
|---|---|
| Agent: | HFC-227ea |
| Cylinder Name: | 368 L Cylinder w/LLI |
| Cylinder Part Number: | 90-100901-001 |
| Agent Per Cylinder: | 300.00 kg |
| Fill Density: | 0.815 kg / l |
| Number of Main Cylinders: | 3 |
| Number of Reserve Cylinders: | 0 |
| Cylinder Empty Weight: | 229.10 kg |
| Weight, All Cylinders + Agent: | 1587.30 kg |
| Floor Area Per Cylinder: | 0.29 m ² |
| Floor Loading Per Cylinder: | 1824 kg /m ² |


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Key ID: 181643511

Kidde Fire Systems

# Consolidated Report

## Parts Report

Total Agent Required: 900.00 kg

Cylinder Name: 368 L Cylinder w/LLI (Part: 90-100901-001)

Number of Cylinders: 3

| Nozzle | Type | Nozzle Diameter | Nozzle Area | Part Number |
|---|---|---|---|---|
| E1-N1 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 1354.84 mm ² | 90-194028-578 |

| Pipe & Fittings | Type | Diameter | Length | Elbows (90) | Elbows (45) | Tees | Unions |
|---|---|---|---|---|---|---|---|
| | 40W | 50 mm | 28.40 m | 8 | 0 | 0 | 0 |
| | 40W | 80 mm | 8.70 m | 3 | 0 | 4 | 0 |
| | 40W | 100 mm | 10.00 m | 0 | 0 | 2 | 0 |
| | 40W | 150 mm | 8.80 m | 2 | 0 | 4 | 0 |

| Other Objects | Name | Quantity | Part Number |
|---|---|---|---|
| | 80 mm Swing Check Valve | 3 | 06-118058-001 |
| | End Cap | 1 | N/A |

## System Acceptance Report

Calculation Date/Time: Thursday, May 18, 2023, 8:35:35 AM

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Key ID: 181643511

Kidde Fire Systems

# Consolidated Report

| | |
|---|---|
| System Discharge Time: | 8.3 seconds |
| Percent Agent In Pipe: | 58.3% |
| Percent Agent Before First Tee: | 31.5% |
| Dead Volume: | 0.0% (0.01 kg) |

| | |
|---|---|
| Enclosure Number: | 1 |
| Enclosure Name: | MDB ROOM (133) PART4 OF4 |
| Minimum Design Concentration: | 7.00% |
| Adjusted Design Concentration: | 7.00% |
| Predicted Concentration: | 7.01% |
| Maximum Expected Agent Concentration: | 7.45% (At 40.0 C) |

| | |
|---|---|
| Maximum Allowed Enclosure Pressure: | 500.00 Pa |
| Estimated Free Vent Area Required (Negative): | 0.60 $m^2$ |
| Estimated Free Vent Area Required (Positive): | 0.16 $m^2$ |
| Installed Vent Area: | 0.00 $m^2$ |
| Predicted Enclosure Pressure (Negative): | N/A |
| Predicted Enclosure Pressure (Positive): | N/A |
| Maximum Enclosure Flow Rate: | 136.25 kg/s |

| Nozzle | Minimum Agent Required | Adjusted Agent Required | Predicted Agent Delivered | Average Nozzle Pressure |
|---|---|---|---|---|
| E1-N1 | 112.43 kg | 112.51 kg | 113.37 kg | 6.850 bar |
| E1-N2 | 112.42 kg | 112.50 kg | 111.81 kg | 6.699 bar |
| E1-N3 | 112.42 kg | 112.50 kg | 111.88 kg | 6.707 bar |
| E1-N4 | 112.42 kg | 112.50 kg | 112.99 kg | 6.810 bar |
| E1-N5 | 112.42 kg | 112.50 kg | 113.97 kg | 6.928 bar |
| E1-N6 | 112.42 kg | 112.50 kg | 110.99 kg | 6.659 bar |
| E1-N7 | 112.42 kg | 112.50 kg | 110.99 kg | 6.659 bar |
| E1-N8 | 112.41 kg | 112.49 kg | 113.97 kg | 6.928 bar |
| Total | 899.36 kg | 900.00 kg | 899.97 kg | |

Calculation Date/Time: Thursday, May 18, 2023, 8:35:35 AM

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Key ID: 181643511

# Consolidated Report

## Pipe Network Report

| Description | Pipe Section | Start Node | End Node | Pipe Type | Pipe Diameter | Pipe Length | Union | Total Elevation Change | Total Equivalent Length | Nozzle Name | Nozzle Size | Nozzle Type | Nozzle Area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cylinder - On | ManR. | 0 | 8 | | 80 mm | 1.50 m | 0 | 1.50 m | 15.24 m | | | | |
| Pipe | ManR. | 8 | 9 | 40W | 80 mm | 0.30 m | 0 | ------ | 0.30 m | | | | |
| Elbow (90) | ManR. | 9 | 10 | 40W | 80 mm | ------ | 0 | ------ | 1.25 m | | | | |
| Pipe | ManR. | 10 | 11 | 40W | 80 mm | 0.30 m | 0 | 0.30 m | 0.30 m | | | | |
| Check Valve -> | ManR. | 11 | 12 | | 80 mm | 0.24 m | 0 | 0.24 m | 3.96 m | | | | |
| Pipe | ManR. | 12 | 13 | 40W | 80 mm | 0.30 m | 0 | 0.30 m | 0.30 m | | | | |
| Tee | Man. | 13 | 14 | 40W | 150 mm | ------ | 0 | ------ | 6.16 m | | | | |
| Pipe | Man. | 14 | 15 | 40W | 150 mm | 0.60 m | 0 | ------ | 0.60 m | | | | |
| Tee | Man. | 15 | 16 | 40W | 150 mm | ------ | 0 | ------ | 2.01 m | | | | |
| Pipe | Man. | 16 | 17 | 40W | 150 mm | 0.60 m | 0 | ------ | 0.60 m | | | | |
| Tee | Man. | 17 | 18 | 40W | 150 mm | ------ | 0 | ------ | 2.01 m | | | | |
| Pipe | Man./End | 18 | 19 | 40W | 150 mm | 0.30 m | 0 | ------ | 0.30 m | | | | |
| Elbow (90) | System | 19 | 20 | 40W | 150 mm | ------ | 0 | ------ | 2.47 m | | | | |
| Pipe | System | 20 | 21 | 40W | 150 mm | 2.30 m | 0 | 2.30 m | 2.30 m | | | | |
| Elbow (90) | System | 21 | 22 | 40W | 150 mm | ------ | 0 | ------ | 2.47 m | | | | |
| Pipe | System | 22 | 23 | 40W | 150 mm | 5.00 m | 0 | ------ | 5.00 m | | | | |
| Tee | System | 23 | 24 | 40W | 100 mm | ------ | 0 | ------ | 4.08 m | | | | |
| Pipe | System | 24 | 25 | 40W | 100 mm | 5.00 m | 0 | ------ | 5.00 m | | | | |
| Tee | System | 25 | 26 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 26 | 27 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |
| Tee | System | 27 | 28 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 28 | 29 | 40W | 50 mm | 3.00 m | 0 | ------ | 3.00 m | | | | |
| Elbow (90) | System | 29 | 30 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 30 | 31 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N1 | 50 mm | 360° | 1354.84 mm $^2$ |
| Tee | System | 27 | 32 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 32 | 33 | 40W | 50 mm | 3.80 m | 0 | ------ | 3.80 m | | | | |
| Elbow (90) | System | 33 | 34 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 34 | 35 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N2 | 50 mm | 360° | 1354.84 mm $^2$ |
| Tee | System | 25 | 36 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 36 | 37 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |
| Tee | System | 37 | 38 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 38 | 39 | 40W | 50 mm | 3.80 m | 0 | ------ | 3.80 m | | | | |

# Consolidated Report

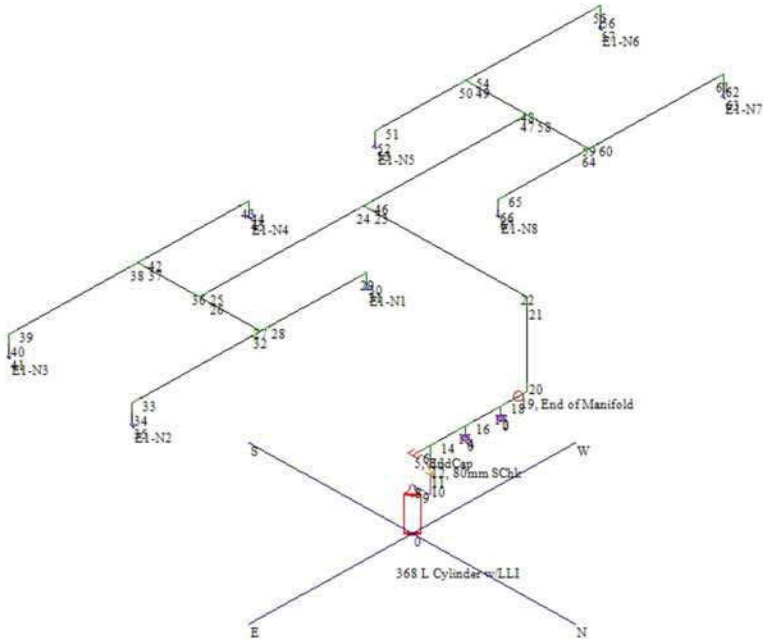
| Description | Pipe Section | Start Node | End Node | Pipe Type | Pipe Diameter | Pipe Length | Union | Total Elevation Change | Total Equivalent Length | Nozzle Name | Nozzle Size | Nozzle Type | Nozzle Area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elbow (90) | System | 39 | 40 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 40 | 41 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N3 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 37 | 42 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 42 | 43 | 40W | 50 mm | 3.20 m | 0 | ------ | 3.20 m | | | | |
| Elbow (90) | System | 43 | 44 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 44 | 45 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N4 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 23 | 46 | 40W | 100 mm | ------ | 0 | ------ | 4.08 m | | | | |
| Pipe | System | 46 | 47 | 40W | 100 mm | 5.00 m | 0 | ------ | 5.00 m | | | | |
| Tee | System | 47 | 48 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 48 | 49 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |
| Tee | System | 49 | 50 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 50 | 51 | 40W | 50 mm | 2.50 m | 0 | ------ | 2.50 m | | | | |
| Elbow (90) | System | 51 | 52 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 52 | 53 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N5 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 49 | 54 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 54 | 55 | 40W | 50 mm | 4.00 m | 0 | ------ | 4.00 m | | | | |
| Elbow (90) | System | 55 | 56 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 56 | 57 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N6 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 47 | 58 | 40W | 80 mm | ------ | 0 | ------ | 3.11 m | | | | |
| Pipe | System | 58 | 59 | 40W | 80 mm | 1.50 m | 0 | ------ | 1.50 m | | | | |
| Tee | System | 59 | 60 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 60 | 61 | 40W | 50 mm | 4.00 m | 0 | ------ | 4.00 m | | | | |
| Elbow (90) | System | 61 | 62 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 62 | 63 | 40W | 50 mm | 0.30 m | 0 | -0.30 m | 0.30 m | E1-N7 | 50 mm | 360° | 1354.84 mm ² |
| Tee | System | 59 | 64 | 40W | 50 mm | ------ | 0 | ------ | 2.10 m | | | | |
| Pipe | System | 64 | 65 | 40W | 50 mm | 2.50 m | 0 | ------ | 2.50 m | | | | |
| Elbow (90) | System | 65 | 66 | 40W | 50 mm | ------ | 0 | ------ | 0.85 m | | | | |
| Pipe&Nozzle | System | 66 | 67 | 40W | 50 mm | 0.10 m | 0 | -0.10 m | 0.10 m | E1-N8 | 50 mm | 360° | 1354.84 mm ² |
| Tee | Man. | 2 | 18 | 40W | 150 mm | ------ | 0 | ------ | 6.16 m | | | | |
| Cylinder + | Man. | 0 | 2 | 40W | 80 mm | 2.64 m | 0 | 2.34 m | 15.24 m | | | | |
| Tee | Man. | 4 | 16 | 40W | 150 mm | ------ | 0 | ------ | 6.16 m | | | | |
| Cylinder + | Man. | 0 | 4 | 40W | 80 mm | 2.64 m | 0 | 2.34 m | 15.24 m | | | | |
| Tee | Man. | 6 | 14 | 40W | 150 mm | ------ | 0 | ------ | 2.01 m | | | | |

# Consolidated Report

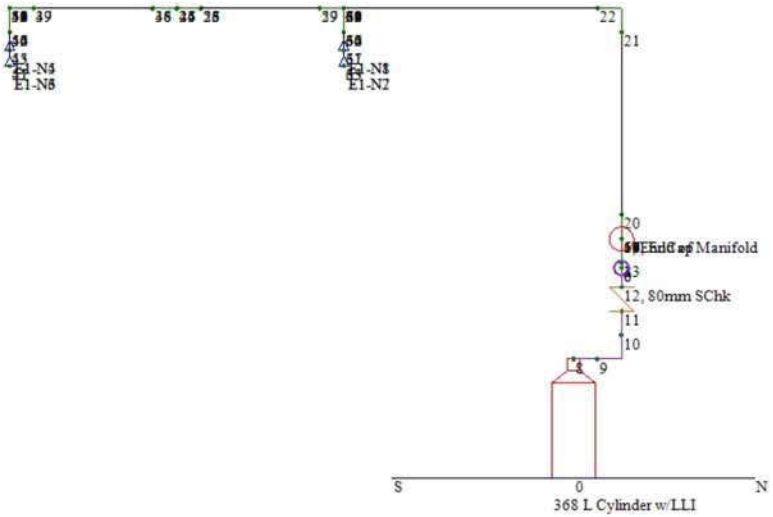
| Description | Pipe Section | Start Node | End Node | Pipe Type | Pipe Diameter | Pipe Length | Union | Total Elevation Change | Total Equivalent Length | Nozzle Name | Nozzle Size | Nozzle Type | Nozzle Area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| End Cap | Man. | 5 | 6 | 40W | 150 mm | 0.10 m | 0 | ------ | 999.00 m | | | | |

# Consolidated Report

View #: 1 - Isometric View-Node

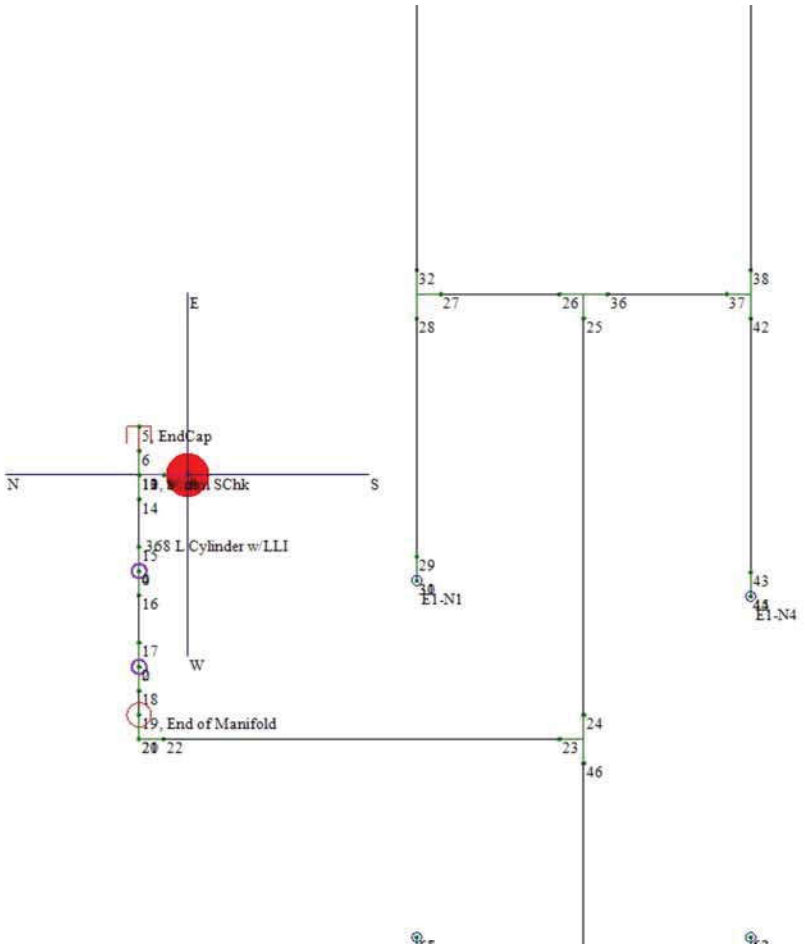


View #: 5 - Standard Elevation View



# Consolidated Report

View #: 9 - Standard Plan View



Date: 06 JULY. 2022

Request no: DWG-CSCEC-17-E01-ME-FF-0028-00

Project N... 08-The Central Business District of the New Administrative Capital of Egypt

| Employer: | Engineer: | Sub Consultant: | Contractor: |
|---|---|---|---|
| New Urban Communities Authority | dar | SHAKER | 中国建筑第五局有限公司 |

**1. Subject description**

CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR FM200 SYSTEM

Area of application: CUC-E01 DISTRICT COOLING PLANT

**2. Submittal details**

| Drawing number | Rev. | Date | Copies | Description | code |
|---|---|---|---|---|---|
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0001-0001-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR MDB ROOM 1-133 FM200 ALARM AND DETECTION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0001-0002-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR MDB ROOM 1-133 PART 1 FM200 SUPPRESSION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0001-0003-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR MDB ROOM 1-133 PART 2 FM200ALARM AND DETECTION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0001-0004-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR MDB ROOM 1-133 PART 3 FM200 SUPPRESSION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0001-0005-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR MDB ROOM 1-133 PART 4 FM200 SUPPRESSION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0001-0006-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR MDB ROOM 1-133 GENERAL LAYOUT FM200 SUPPRESSION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0002-0001-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR IT ROOM 1-132 FM200 ALARM AND DETECTION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0002-0002-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR IT ROOM 1-132 FM200 SUPPRESSION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0003-0001-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR BATTERY ROOM 1-105 FM200 ALARM AND DETECTION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0003-0002-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR BATTERY ROOM 1-105 FM200 SUPPRESSION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0004-0001-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR UPS ROOM 1-106 FM200 ALARM AND DETECTION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0004-0002-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR UPS ROOM 1-106 FM200 SUPPRESSION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0005-0001-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR BATTERY ROOM 1-129 FM200 ALARM AND DETECTION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0005-0002-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR BATTERY ROOM 1-129 FM200 SUPPRESSION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0006-0001-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR CUC FMCR ROOM 1-104 FM200 ALARM AND DETECTION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0006-0002-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR CUC FMCR ROOM 1-104 FM200 SUPPRESSION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0007-0001-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR UPS ROOM 1-130 FM200 ALARM AND DETECTION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0007-0002-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR UPS ROOM 1-130 FM200 SUPPRESSION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0008-0001-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR IT ROOM 1-110 FM200 ALARM AND DETECTION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0008-0002-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR IT ROOM 1-110 FM200 SUPPRESSION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0009-0001-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR FMSR ROOM 1-107 FM200 ALARM AND DETECTION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0009-0002-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR FMSR ROOM 1-107 FM200 SUPPRESSION SYSTEM | B |
| SHD-CSCEC-17-E01-MF-FF-04-01-01-0010-0001-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR BMS ROOM 1-124 FM200 ALARM AND DETECTION SYSTEM | B |
| SHD-CSCEC-17-E01-ME-FF-04-01-01-0010-0002-00 | 0 | 06 JULY. 2022 | 1 | CUC-E01 DISTRICT COOLING PLANT FIRST FLOOR BMS ROOM 1-124 FM200 SUPPRESSION SYSTEM | B |

refer to comments

These are transmitted for:

☐ Your information ☑ Approval | Checking ☐ Review and Comment

We certify that the above shop drawings have been coordinated

Submitted by: WANGWEI Signature:

**3. Engineer's Representative comments**

1-refer to comments on each dwgs . and attached A4 sheet

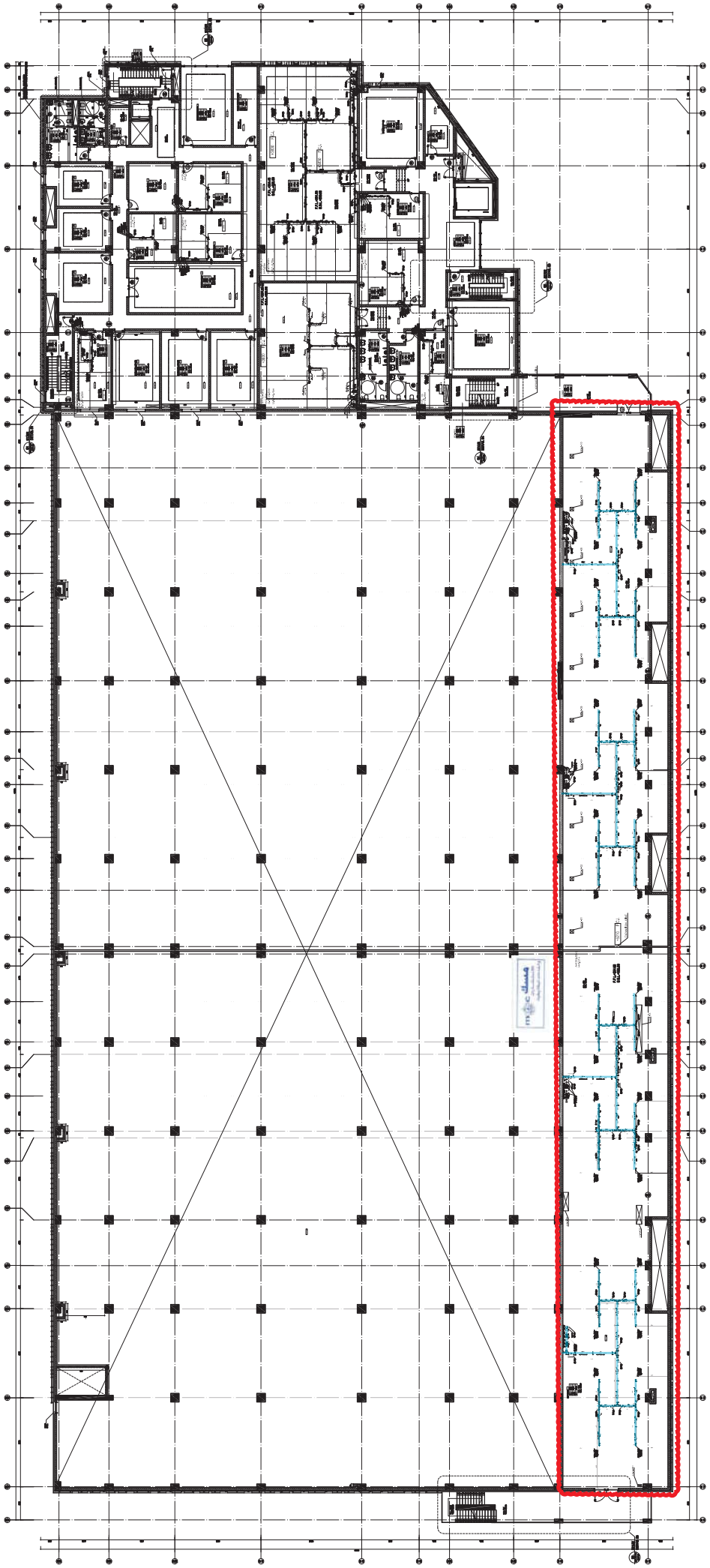
SCG:PL&FF :Khaled -awad-20-07-2022

Signature Bahaa shahin Date: 20-07-2022

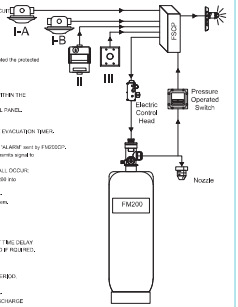
Approval shall not relieve Contractor of his liabilities under the Contract or constitute authorization of any change to Contract Documents.

E18088-2CCS-S-PRC-SB-02(F27) Rev 0 (Package 17)

dar



## SEQUENCE OF OPERATION AS PER TOD




MANUAL OPERATION

* Operating manual-release stations will discharge extinguishing agent when activated SEQUENCE DESCRIBED ABOVE EXCEPT TIME DELAY AND ABORT FUNCTIONS, TIME DELAY CAN BE PROGRAMMED IF REQUIRED.

ABORT OPERATION

* IF ABORT SWITCH IS ACTIVATED WITHIN PRE-DISCHARGE PERIOD THE FOLLOWING SHALL OCCUR:
1.ILLUMINATE ABORT INDICATOR ON THE CONTROL PANEL.
2.RELEASE OF GAS WILL DELAY EXTINGUISHING AGENT DISCHARGE IF ABORT SWITCH IS PRESSED CONTINUOUSLY.
3.AGENT WILL RELEASE IF ABORT SWITCH IS RELEASED AND COUNTDOWN IS COMPLETED.

FLOW AGENT PRESSURE SWITCH

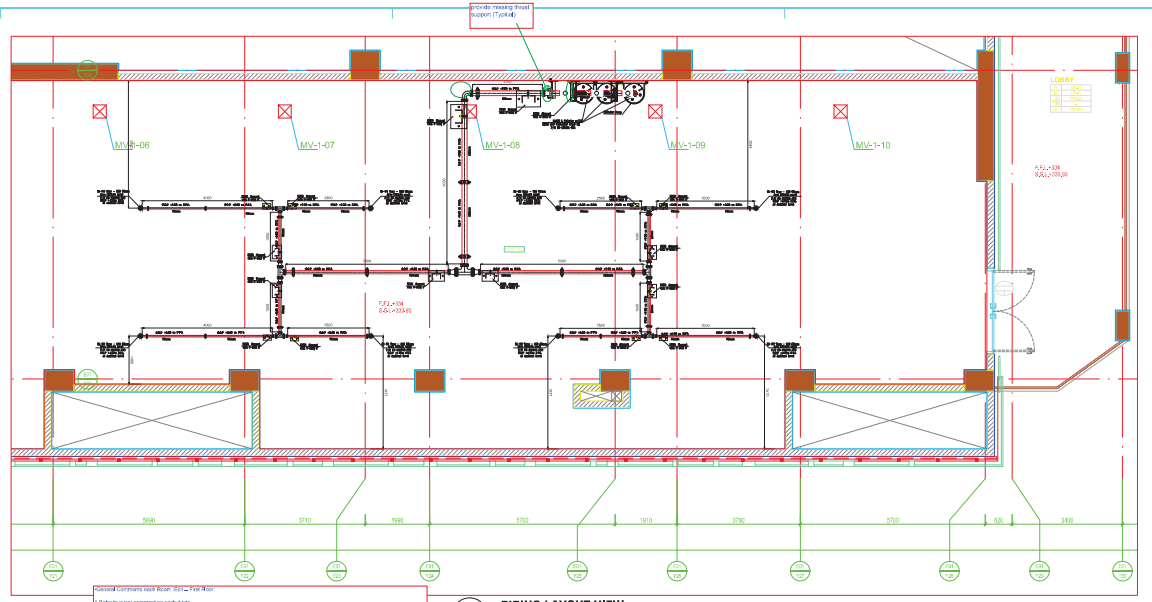
1.Initiate trouble alarm if pressure less than set pressure.
2.ILLUMINATE "SUP" INDICATOR ON THE CONTROL PANEL.

## MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 1

| nozzle | type | nozzle DIA | part number |
|---|---|---|---|
| E1-N1 | 360° | 50 mm | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 90-194028-578 |

| SRO | DESCRIPTION | QTY | MODEL NO. |
|---|---|---|---|
| 1 | MAIN CYLINDER WITH CYLINDER VALVE & LLI | 5 PCS | 90-XXXXX-XXX-101 |
| 2 | CYLINDER STRAP | 5 PCS | |
| 3 | ELECTRICAL CONTROL HEAD | 1 PCS | 90-XXXXX-XXX-119-000 |
| 4 | SUPERVISORY PRESSURE SWITCH | 1 PCS | 90-XXXXX-152-000 |
| 5 | FIRE SUPPRESSION CONTROL PANEL | 1 PCS | MDB-S-2U |
| 6 | MULTI TONE HORN / STROBE | 1 PCS | MDB-A |
| 7 | MANUAL PULL STATION | 1 PCS | 90-XXXXX-XXX-001 |
| 8 | ABORT SWITCH | 1 PCS | 90-XXXXX-XXX-119 |
| 9 | PHOTO SMOKE DETECTOR | 48 PCS | DSD-HPS |
| 10 | HEAT DETECTOR | 48 PCS | DSD-HPS |
| 11 | ALARM BELL 6" | 1 PCS | MB-6-24 |
| 12 | PRESSURE OPERATED HEAD | 2 PCS | 90-XXXXX-XXX-000 |
| 13 | Swing Check Valve 3" | 5 PCS | 90-XXXXX-152-000 |
| 14 | Adaptor for 3 " | 1 PCS | WM-3X1MM-003 |
| 15 | Male Elbow 3" *Bore x 1/8" NPT | 2 PCS | WM-999999-000 |
| 16 | Male Connector 3" *Bore x 1/8" NPT | 2 PCS | WM-999999-000 |
| 17 | KIDDE ASM MODULE | 2 PCS | 70-XXXXX-XXX |
| 18 | KIDDE AO RELAY MODULE | 6 PCS | 70-XXXXX-XXX |
| 19 | KIDDE AI MONITOR MODULE | 1 PCS | 70-XXXXX-XXX |
| 20 | KIDDE IRM RELEASING MODULE | 4 PCS | 70-XXXXX-XXX |
| 21 | | | |

Application schedule of pipes/fittings and Cables / outback boxes /raceway conduits and fittings application schedule should be provided as per approved MAT

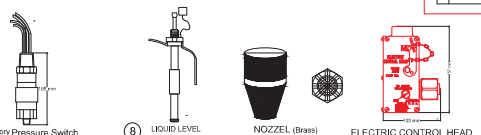


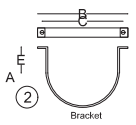

### PIPING LAYOUT VIEW
Scale 1:100

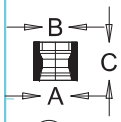
General Comments each Room :SH1 – First Floor

1.Refer to every comment on each page.
2.As per NFPA 2001 latest edition, thrust supports details and calculations for Grooved Elbows (thrust support adequate to offset thrust forces).
3.As per NFPA 2001 latest edition ( Rigid hangers shall be installed wherever a change in elevation or direction occurs).
4.All Pipes shall be secured and restrained against movement (Seismic restrained/bolted).
5.All pipes support shall be Hot-dip galvanized (Typical).
6.All pipes and piping supports shall be CLV M (weighting black electrical EQUIV. tubes as specified on of Material data sheet of MEBC FM200 Master Material, MA-CSCEC-01-MSH-7-18-0401 and confirmed with ANSI/MSS SP-58 for Materials, selection, distance between supports ).
7.Under contractor responsibility to get required performance without any extra cost ;
8.Follow NFPA 2001 Requirement for construction cases for Nozzles distribution to avoid any steel beams OR MEP obstructed services inside room during preparation shop drawings, (under contractor responsible)
9.All Holes of pipes and Nozzles should be coordinated with approved composite drawings inside room and approved Electrical shop drawings and Pulse Ceiling raised floor Elec Trenches shop drg during preparation FM200 System shop drawings ;
10.In case of routing modifications or Nozzle due to obstruction with other utility due to areas coordination on site, the hydraulic calculation should be recalculated according to as built drawings.
11.Any modification due to site condition new calculation shall be submitted for approval as per as-built on site.
12.For FM200 sequence of operation Refer to comments on the last revision of approved TOD-CSCEC-17-ZZ-SAR-EN-000500 FM200 sequence of operation Subject to the approval & comments of TOD-CSCEC-MEC-SHE-FM-000501 for co-ordination with the other services.
14.Shaft, finisher, control panel, Control panel , ... Etc., to be as per approved Materials.
15.shop drawings shall be coordinated with other trades and arch drawings.
16.Weight of cylinders should be coordinated with Structure dwgs.
17.Contractor is responsible to coordinate FM200 system with requirements of HVAC & Fire Alarm for interlock of equipment during or in case of fire
18.Contractor is responsible to coordinate location and sequence of operation for Annunciator Panel with fire alarm dwgs and specs.
19.Provide sequence of operation for FM200 system prior installation in separate MS1
20.Installation and test & commissioning shall be submitted separately in separate MS1
21.All Pipe cutting Height from raised floor/Trenches shall be checked with the shop dwgs.
22.All Pipes and Fittings shall be installed as per approved Materials and shall be aligned with Approved Arch shop dwgs
23.BTU &PSI ( HC Agent Capacity (CR000635/15 MBSC calculation approv(14-07-2022) as per FM-41-PV001 System minutes of meeting held on 2(4-March -2022 as per Letter Ref:EI10066-G2005/DCI/CPT/Accordng to the actual calculated Hydraulic calculation of FM200 Gas quantities submitted from Supplier MBSC for PKG-CUC Buildings REVISED) are lower than IPC RQD Capacity by approx. 15(2 % . Dar/ Shaker- CSCEC to provide reserved spare Cylinders for the remaining FM200 Gas quantities OR Cost Saving shall be provided).
24.Refer to every point in PKG-CP-MDW Systems minutes of meeting held on 2(4March -2022 as per Letter Ref:EI10066-G2005/DCI/CPT/E
25.Refer to every comment on attached minutes of meeting Date:22/06/2022 between Dar/Shaker/ CSCEC/ MBSC/ TEMBO (P/T-CUC- Fire Fighting FM200 handing reserv (plan support Calculation & GAD presentations & CO.CJ/CSCEC-TJ/WUJM-LP-21/35JH
26.Outdoor Control panel shall be installed inside approved weatherproof enclosure.
27.As per space pipes shall be : Black Steel Pipe ASTM A 53/A 53M , Type S, Grade A or ASTM A 106/A 106M, Grade A; Schedule 80, seamless steel pipe, & All Threaded Fitting shall be Forged high pressure fitting type 3000 LBS as per specs Manufacturer-ion, Threaded Fittings ASME B16.3 , Class 3000 , Not 2000 LBS as mentioned in MAT1
28.Application schedule of pipes/fittings and Cables / outback boxes /raceway conduits and fittings application schedule should be provided as per approved MAT

### GENERAL COMPONENTS DETAILS
N.T.S

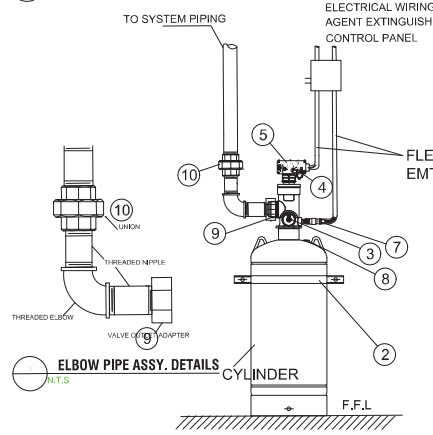

7 Supervisory Pressure Switch P/N: 06-118262-001
8 LIQUID LEVEL INDICATOR LLI
NOZZEL (Brass)
ELECTRIC CONTROL HEAD 5 P/N. 890181




| VALVE OUTLET ADAPTORS | | | | | | |
|---|---|---|---|---|---|---|
| PART NO. | SIZE | A | B | C | D | WEIGHT |
| WM-283050-000 | 80mm | OD(3) (3-1/2") | 5.874 | 68mm | 93mm | 0.2 kg |
| WM-283053-000 | 51mm | OD(3) (2") | 2.000 | 78mm | 78mm | 0.3 kg |
| WM-283500-000 | 165mm (2.0") | OD(3) (3-1/2") | 3.00 | 78mm | 90mm | 0.2 kg |

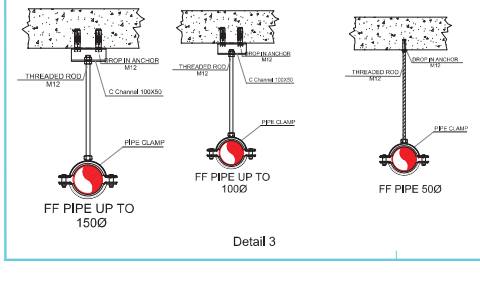
### MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS
N.T.S




| MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS | |
|---|---|
| SN | DESCRIPTION |
| 1 | CYLINDER |
| 2 | BRACKET |
| 3 | CYLINDER VALVE |
| 4 | MANUAL LEVER |
| 5 | ELECTRIC CONTROL HEAD |
| 6 | PRESS. SWITCH |
| 7 | SUPERVISORY PRESS. SWITCH |
| 8 | LIQUID LEVEL INDICATOR |
| 9 | OUTLET VALVE ADAPTOR |
| 10 | UNION |
| 11 | MAINTENANCE SWITCH |
| 12 | JUNCTION BOX |
| 13 | FLEXIBLE EMT |

### ELBOW PIPE ASSY. DETAILS
N.T.S

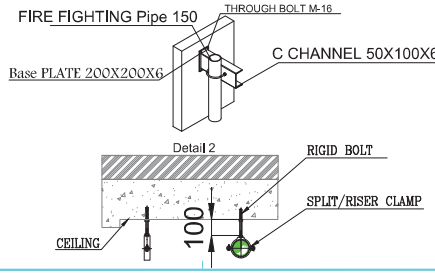
| HANGER SPAC AS PER ANSI B3 | |
|---|---|
| PIPE SIZE mm (in) | HANGER SPACING M (ft) |
| 15 (1/2") | 2.4 (8ft) |
| 20 (3/4") | 2.7 (9ft) |
| 25 (1") | 2.7 (9ft) |
| 32 (1 1/4") | 2.7 (9ft) |
| 40 (1 1/2") | 3.7 (12ft) |
| 50 (2") | 4 (13ft) |
| 65 (2 1/2") | 4.3 (14ft) |
| 80 (3") | 4.6 (15ft) |
| 100 (4") | 5.2 (17ft) |



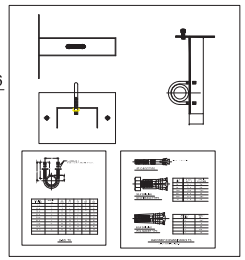

Detail 3

### Pipe Support Details
N.T.S

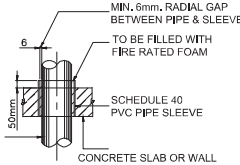
Detail 1 RIGID SUPPORT




Detail 1 RIGID SUPPORT



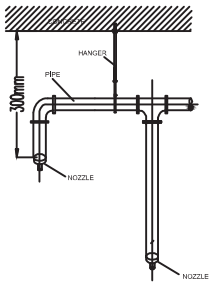
### ISOMETRIC VIEW
NTS

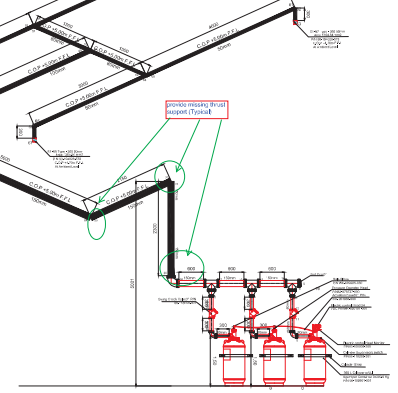

MIN. 6mm. RADIAL GAP BETWEEN PIPE & SLEEVE
6
TO BE FILLED WITH FIRE RATED FOAM
50mm
SCHEDULE 40 PVC PIPE SLEEVE
CONCRETE SLAB OR WALL

PIPE SLEEVE SCHEDULE:

| PIPE SIZE IN MM | SELLVE SIZE IN MM |
|---|---|
| 65 | 100 |
| 100 | 150 |

PIPE SLEEVE GENERAL




MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 1

Client:
Ministry of Housing, Utilities & Urban Development
New Urban Communities Authority

Main Consultant:
dar Dar Al-Handasah (Egypt)

Sub-Consultant:
SHAKER

Contractor:

Project Name:
Central Business District Of the New Administrative Capital
CBD EAST - PHASE 1

Key Plan:

dar Dar Al-Handasah
Project No.: E10066-G2005
CODE 1 APPROVED
CODE 2 APPROVED AS NOTED Work may proceed subject to incorporation of endorsed comments
CODE 3 RESUBMIT FOR APPROVAL Work may not proceed
CODE 4 REJECTED
By: Khaled awad Date: 21-07-2022
Approval shall not relieve the Contractor of any of his obligations under the Contract or constitute authorization of any change to Contract Documents or variation to the Works. Contractor is responsible for dimensions, quantities and coordination with other trades.

| | |
|---|---|
| ADDRESSABLE SMOKE DETECTOR Model DP-PS | D |
| ADDRESSABLE HEAT DETECTOR Model DP-HPS | D |
| FIRE BELL Model MB-6-24 | |
| STROBE WITH FLASHER Model MHB-A | SF |
| GAS ABORT Model Kidde 878762 | A |
| MANUAL RELEASE Kidde 2000 | M |
| FM200 CYLINDER | |
| Tube Outlet Adapter 3.5" P/N WM-283050-000 | |
| Cylinder Supervisory switch P/N90-118262-001 | |
| Electric control Head 24 VDC P/N90-890181-000 | |
| Electric control Head Monitor P/N90-100000-000 | |
| FM200 Nozzle | |
| KIDDE RELEASING MODULE RMM P/N 70-400000-001 | |
| KIDDE OUTPUT RELAY MODULE AO P/N 70-400004-001 | |
| KIDDE INPUT MONITOR MODULE AI P/N 70-417000-001 | AI |
| KIDDE OUTPUT SIGNAL MODULE ASM P/N 70-300200-000 | |

Reference Table :

| Type | No. | Ref. No. | Date |
|---|---|---|---|
| Drawings | 01 | E10066-G1000-PDA-7-ZZ-SAR-100000-RD-001 | 31/03/2019 |
| Documents | | | |

Coordination Table :

| Discipline | Signature | Date |
|---|---|---|
| Architecture | | |
| Structure C. | | 29 APR 2022 |
| Structure S. | | 29 APR 2022 |
| Electrical | | |
| Plumbing | | 29 APR 2022 |
| HVAC | | |
| Other | | 29 APR 2022 |

Revision Table:

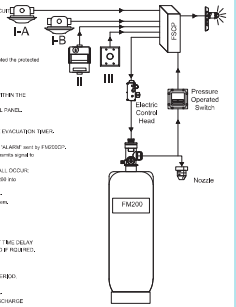
| No. | Description | Date | Appr. |
|---|---|---|---|
| 00 | FOR APPROVAL | 14 MAY 2022 | ETHAN. |

Drawing Title:
CUC-E01 UTILITY BUILDING
FIRST FLOOR
MBD ROOM 1-133 PART 1
FM200 SUPPRESSION SYSTEM

| Designed | Checked | Approved |
|---|---|---|
| GINNY | GINNY | ETHAN |
| Drawn | Date | Scale |
| KARIM ALLAM | 11 MAY 2022 | 1:100 |

| SHD | CSCEC | 17 | E01 | ME | FF | 04 | 01 | 01 | 0001 | 0002 | 00 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Contractor | Package No. | Building Type | Work Group | Sub Discipline | Discipline Type | Floor Level | Part No. | Sheet No. | Sequence No. | Revision No. |

## SEQUENCE OF OPERATION AS PER TOD




MANUAL OPERATION

* Operating manual-release stations will discharge extinguishing agent when activated SEQUENCE DESCRIBED ABOVE EXCEPT TIME DELAY AND ABORT FUNCTIONS, WHICH DELAY CAN BE PROGRAMMED IF REQUIRED.

B-ABORT OPERATION

* IF ABORT SWITCH IS ACTIVATED WITHIN PRE-DISCHARGE PERIOD THE FOLLOWING SHALL OCCUR:
1-ILLUMINATE ABORT INDICATOR ON THE CONTROL PANEL.
2-RELEASE OF GAS WILL DELAY EXTINGUISHING AGENT DISCHARGE IF ABORT SWITCH IS PRESSED CONTINUOUSLY.
3-AGENT WILL RELEASE IF ABORT SWITCH IS RELEASED AND COUNTDOWN IS COMPLETED.

B-LOW AGENT PRESSURE SWITCH:
1-Initiate trouble alarm if pressure less than set pressure.
2-ILLUMINATE "SUPV" INDICATOR ON THE CONTROL PANEL.

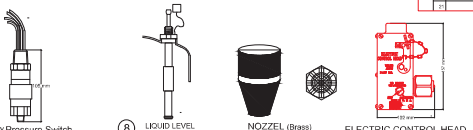
## MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 2

| nozzle | type | nozzle DIA | part number |
|---|---|---|---|
| E1-N1 | 360° | 50 mm | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 90-194028-578 |

| S.NO. | | QTY | MODEL NO. |
|---|---|---|---|
| 4 | MAIN CYLINDER WITH CYLINDER VALVE & LLI | 1 PCS | 06-333001-101 |
| 2 | CYLINDER STRAP | 3 PCS | |
| 3 | ELECTRICAL CONTROL HEAD | 1 PCS | 06-890181-200 |
| 4 | SUPERVISORY PRESSURE SWITCH | 2 PCS | 06-118262-001 |
| 5 | FIRE SUPPRESSION CONTROL PANEL | 1 PCS | ARIES 2.0 |
| 6 | MULTI TONE HORN / STROBE | 1 PCS | HSRA |
| 7 | MANUAL PULL STATION | 1 PCS | 06-333002-001 |
| 8 | ABORT SWITCH | 1 PCS | 06-278782-210 |
| 9 | PHOTO SMOKE DETECTOR | 66 PCS | 06-75 |
| 10 | HEAT DETECTOR | 66 PCS | 06-175 |
| 11 | ALARM BELL 6" | 1 PCS | MBA-6-24 |
| 12 | PRESSURE OPERATED HEAD | 2 PCS | 06-278737-200 |
| 13 | Swing Check Valve 3" | 3 PCS | 06-118269-001 |
| 14 | Actuation hose 3 " | 2 PCS | WK-356906-000 |
| 15 | Male Elbow 90 °, Thru x 1/8" NPT | 2 PCS | WK-356005-0430 |
| 16 | Male Connector, 90 °Thru x 1/8" NPT | 2 PCS | WK-356005-0410 |
| 17 | KIDDE ASM MODULE | 2 PCS | 76-890202-003 |
| 18 | KIDDE AD RELAY MODULE | 0 PCS | 76-890304-001 |
| 19 | KIDDE AI MONITOR MODULE | 7 PCS | 71-71009-001 |
| 20 | KIDDE RIM RELEASING MODULE | 4 PCS | 76-890203-001 |
| 21 | | | |

## GENERAL COMPONENTS DETAILS

N.T.S



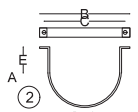
⑦ Supervisory Pressure Switch P/N: 06-118262-001

⑧ LIQUID LEVEL INDICATOR LLI

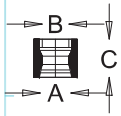
NOZZEL (Brass)

ELECTRIC CONTROL HEAD ⑤ P/N. 890181

Application schedule of pipes/fittings and Cables / outback boxes /raceway conduits and fittings application schedule should be provided as per approved MAT



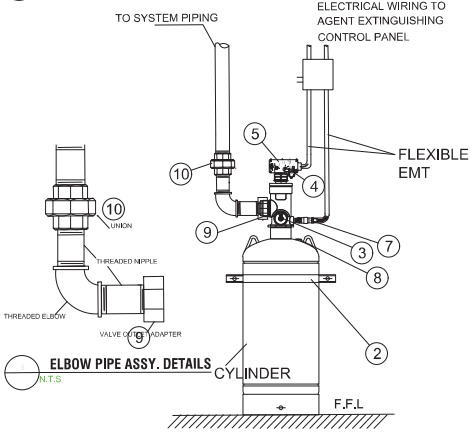
Bracket ②



| VALVE OUTLET ADAPTORS | | | | | | |
|---|---|---|---|---|---|---|
| PART NO. | SIZE | A | B | C | D | WEIGHT |
| WK-283603-000 | 89mm | CC/3D (3-1/2") | 5.874 | 68mm | 57mm | 5.2 kg |
| WK-283603-000 | 51mm | CC/3D (2") | 2,000 | 78mm | 78mm | 5.3 kg |
| WK-283502-000 | 165mm (2.0") | CC/3D (3-1/2") | 3.43 | 78mm | 90mm | 5.2 kg |

## MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS

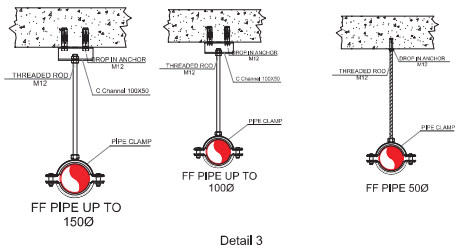
N.T.S



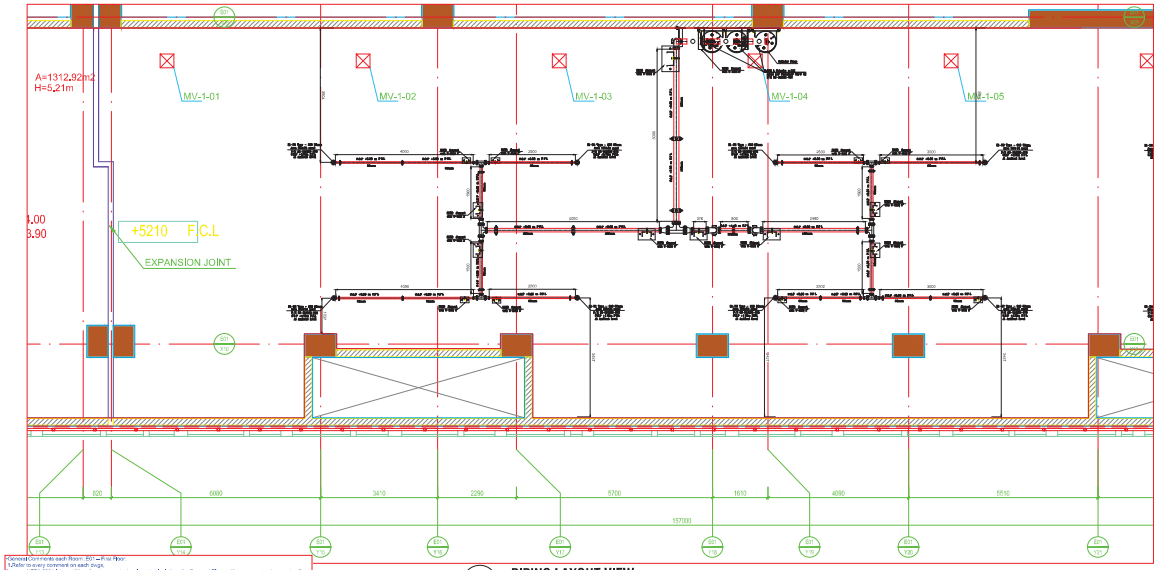

## ELBOW PIPE ASSY. DETAILS

N.T.S

| MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS | |
|---|---|
| SN | DESCRIPTION |
| 1 | CYLINDER |
| 2 | BRACKET |
| 3 | CYLINDER VALVE |
| 4 | MANUAL LEVER |
| 5 | ELECTRIC CONTROL HEAD |
| 6 | PRESS. SWITCH |
| 7 | SUPERVISORY PRESS. SWITCH |
| 8 | LIQUID LEVEL INDICATOR |
| 9 | OUTLET VALVE ADAPTOR |
| 10 | UNION |
| 11 | MAINTENANCE SWITCH |
| 12 | JUNCTION BOX |
| 13 | FLEXIBLE EMT |



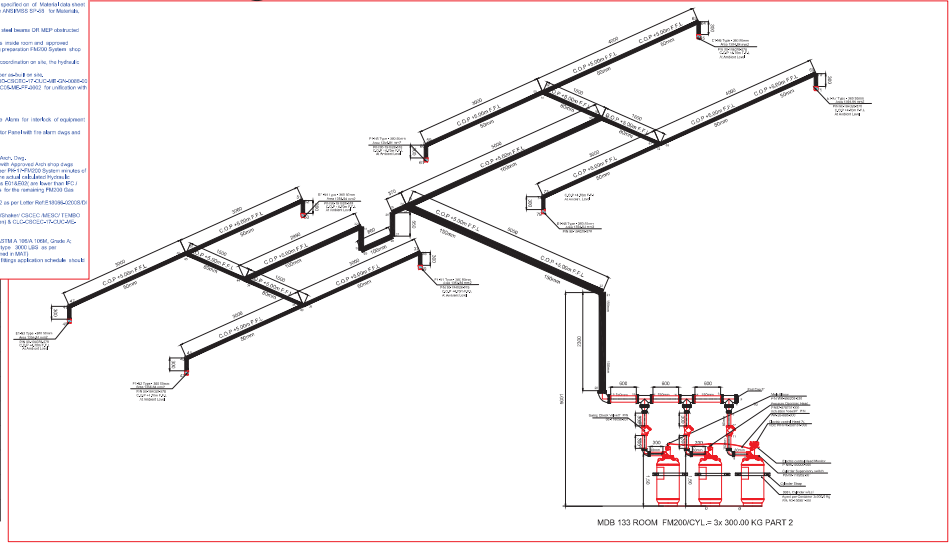

Detail 3




## PIPING LAYOUT VIEW

Scale 1:100

| mm (in) | M (ft) |
|---|---|
| 15 (1/2") | 2.4 (8ft) |
| 20 (3/4") | 2.7 (9ft) |
| 25 (1") | 2.7 (9ft) |
| 32 (1 1/4") | 2.7 (9ft) |
| 40 (1 1/2") | 3.7 (12ft) |
| 50 (2") | 4 (13ft) |
| 65 (2 1/2") | 4.3 (14ft) |
| 80 (3") | 4.6 (15ft) |
| 100 (4") | 5.2 (17ft) |

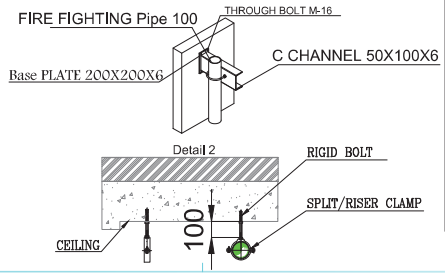


MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 2

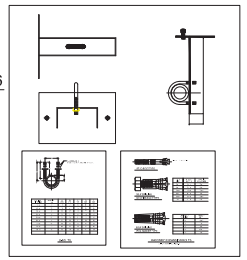
## Pipe Support Detalis

N.T.S

Detail 1 RIGID SUPPORT

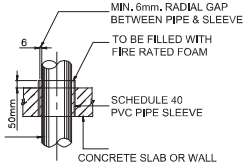



Detail 1 RIGID SUPPORT



## ISOMETRIC VIEW

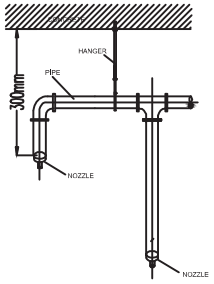
NTS


MIN. 6mm. RADIAL GAP BETWEEN PIPE & SLEEVE
TO BE FILLED WITH FIRE RATED FOAM
SCHEDULE 40 PVC PIPE SLEEVE
CONCRETE SLAB OR WALL
6
50mm

PIPE SLEEVE SCHEDULE:

| PIPE SIZE IN MM | SELLVE SIZE IN MM |
|---|---|
| 65 | 100 |
| 100 | 150 |

PIPE SLEEVE GENERAL




Client:

Ministry of Housing, Utilities & Urban Development

New Urban Communities Authority

Main Consultant:

Dar Al-Handasah (Egypt)

Sub-Consultant:

SHAKER

Contractor:

中国能源建设集团有限公司

Project No.: E18066-02005

CODE 1 APPROVED

CODE 2 APPROVED AS NOTED Work may proceed subject to incorporation of endorsed comments

CODE 3 RESUBMIT FOR APPROVAL Work may not proceed

CODE 4 REJECTED

By: Khaled awad Date: 21-07-2022

Approval shall not relieve (-) Contractor of any of his obligations under the Contract or constitute authorization of any change to Contract Documents. Variation to the Works. Contractor is responsible for dimensions, quantities and coordination with other trades.

NOTES / LEGEND:

| Legend | Symbol |
|---|---|
| FIRE FIGHTING AND ALARM/CONTROL PANEL Model ARIES | F.F.C.P |
| ADDRESSABLE SMOKE DETECTOR Model SD-PH | |
| ADDRESSABLE HEAT DETECTOR Model SD-HPH | |
| FIRE BELL Model MBA-6-24 | |
| STROBE WITH FLASHER Model HSR-A | SF |
| GAS ABORT Model Kidde 878782 | A |
| MANUAL RELEASE Kidde 3200 | M |
| FM200 CYLINDER | |
| Tube Outlet Adapter 2.5" P/N 90-890202-000 | |
| Cylinder Supervisory switch P/N90-118262-001 | |
| Electric control Head 24 VDC P/N90-890181-000 | |
| Electric control Head Number P/N90-890000-000 | |
| FM200 Nozzle | |
| KIDDE RELEASING MODULE RIM P/N 70-890203-001 | |
| KIDDE OUTPUT RELAY MODULE AO P/N 70-890304-001 | |
| KIDDE INPUT MONITOR MODULE AI P/N 71-71009-001 | |
| KIDDE OUTPUT SIGNAL MODULE ASM P/N 70-890202-003 | |

Revision Table:

| No. | Description | Date | Appr. |
|---|---|---|---|
| 00 | FOR APPROVAL | 14 MAY 2022 | ETHAN. |

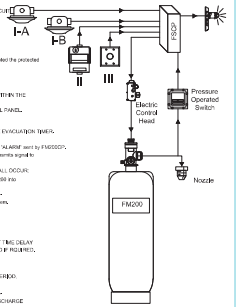
Drawing Title:

CUC-E01 UTILITY BUILDING
FIRST FLOOR
MBD ROOM 1-133 PART 2
FM200 SUPPRESSION SYSTEM

| Designed | Checked | Approved |
|---|---|---|
| GHANY | GHANY | ETHAN |
| Drawn | Date | Scale |
| KARIM ALLAM | 11 MAY 2022 | 1:100 |

| SHD Type | CSCEC Contractor | 17 Package No. | E01 Building Type | ME Drawing Type | FF Sub Drawing | 04 Electro Type | 01 Floor Level | 0001 Part No. | 0003 Sheet No. | 00 Sequence No. | 00 Rev. No. |
|---|---|---|---|---|---|---|---|---|---|---|---|

## SEQUENCE OF OPERATION AS PER TOD




MANUAL OPERATION

A) ACTUATION OF ANY ONE OF THE DETECTORS IN EITHER CIRCUIT WITHIN THE PROTECTED AREA SHALL:
1.ILLUMINATE ALARM INDICATOR ON THE CONTROL PANEL.
2.FM200CP energizes Alarm Bell inside protected areas.
3.Give visual indication on annunciator panel.
4.FM200CP transmits "ALARM" signals BMS system.
5.FM200CP transmits "ALARM" signals FAS system.
6.Start the predetermined Time delay to actuation to close all NFDs related the protected area.
7.Actions and close doors in protected area.

B) SUBSEQUENT OPERATION OF A CROSS-ZONED DETECTOR WITHIN THE PROTECTED AREA SHALL:
1.ILLUMINATE PRE-DISCHARGE INDICATOR ON THE CONTROL PANEL.
2.FM200CP energize Horn/Strobe Device inside protected areas.
3.Give visual indication on annunciator panel.
4.ACTIVATE CIRCUIT TO ENERGIZE 0-30 SECOND ADJUSTABLE EVACUATION TIMER.
5.ENABLE SYSTEM ABORT SEQUENCE.
6.AHU, FAN will be shut down via FAS through MCC panelbased on "ALARM" sent by FM200CP.
7.On Cable Ada Compartment (Pre-FM200 release only) FM200CP transmits signal to Cold aisle containment control box to open all its windows.

C) AFTER PRE-SET TIME DELAY SEQUENCING THE FOLLOWING SHALL OCCUR:
1.Solenoid Valves FM200CP energizes solenoid valve to release FM200 into the protected area.
2.ILLUMINATE "RELEASE" INDICATOR ON THE CONTROL PANEL.
3.On FAS FM200CP transmits "GAS RELEASED" signal to FAS system.

MANUAL OPERATION

* Operating manual-release stations will discharge extinguishing agent when activated SEQUENCE DESCRIBED ABOVE EXCEPT TIME DELAY AND ABORT FUNCTIONS, WHICH CAN BE PROGRAMMED IF REQUIRED.

ABORT OPERATION

* IF ABORT SWITCH IS ACTIVATED WITHIN PRE-DISCHARGE PERIOD THE FOLLOWING SHALL OCCUR:
1.ILLUMINATE "ABORT" INDICATOR ON THE CONTROL PANEL.
2.RELEASE OF GAS WILL DELAY EXTINGUISHING AGENT DISCHARGE IF ABORT SWITCH IS PRESSED CONTINUOUSLY.
3.AGENT WILL RELEASE IF ABORT SWITCH IS RELEASED AND COUNTDOWN IS COMPLETED.

FLOW AGENT PRESSURE SWITCH

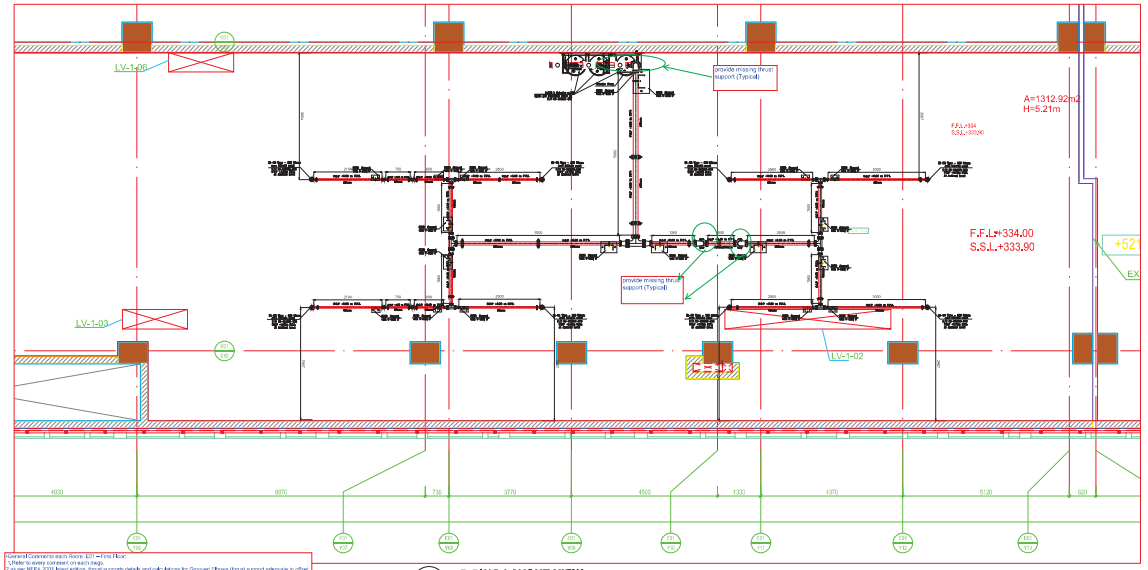
1.Initiate trouble alarm if sensing less than set pressure.
2.ILLUMINATE "SUPV" INDICATOR ON THE CONTROL PANEL.

## MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 3

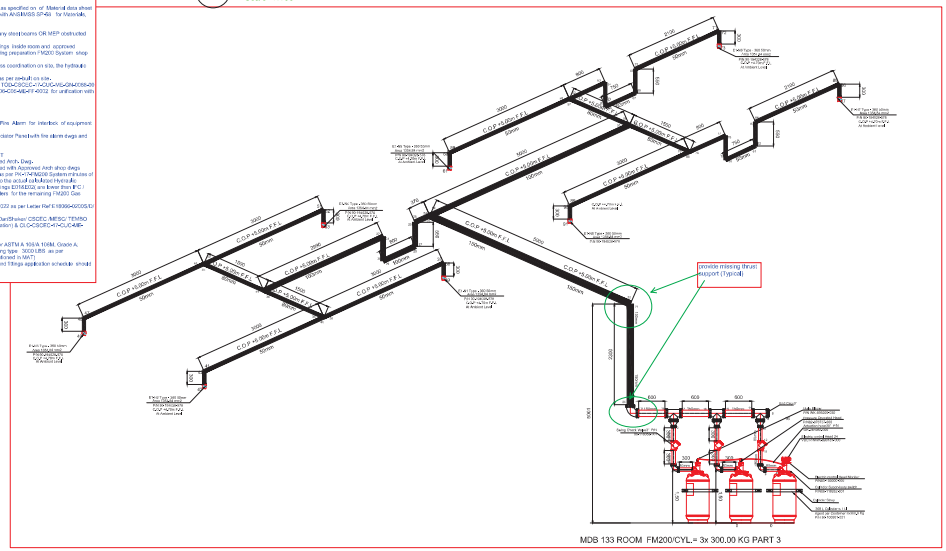
| nozzle | type | nozzle DIA | part number |
|---|---|---|---|
| E1-N1 | 360° | 50 mm | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 90-194028-578 |

| NO. | | QTY | MODEL NO. |
|---|---|---|---|
| 1 | MAIN CYLINDER WITH CYLINDER VALVE & LLI | 3 | FCM-50-195001-001 |
| 2 | CYLINDER STRAP | 3 | FCS |
| 3 | ELECTRICAL CONTROL HEAD | 1 | FCM-50-195181-000 |
| 4 | SLIM PILBORY PRESSURE SWITCH | 3 | FCM-05-195202-001 |
| 5 | FIRE SUPPRESSION CONTROL PANEL | 1 | FCM-AR53-2.2-2 |
| 6 | INDUCTIONE HORN / STROBE | 1 | FCM-PHT-N-1 |
| 7 | MANUAL PULL STATION | 1 | FCM-05-195002-001 |
| 8 | ABORT SWITCH | 1 | FCM-05-197057-010 |
| 9 | PHOTO SMOKE DETECTOR | 44 | FCM-05-195-PS |
| 10 | HEAT DETECTOR | 44 | FCM-05-195-HTS |
| 11 | ALARM BELL 6 " | 1 | FCM-MB-N-6-24 |
| 12 | PRESSURE OPERATED HEAD | 2 | FCM-05-197217-000 |
| 13 | Swing Check Valve 3" | 3 | FCM-05-195209-001 |
| 14 | Actuator hose 1 " | 2 | FCM-05-195206-000 |
| 15 | Male Elbow ⅜" Flare x ⅜" NPT | 2 | FCM-WK-4-195205-000 |
| 16 | Male Connector ⅜" Flare x ⅜" NPT | 2 | FCM-WK-4-195205-010 |
| 17 | NODE ASH MODULE | 2 | FCM-75-195203-000 |
| 18 | NODE AO RELAY MODULE | 1 | FCM-75-195201-001 |
| 19 | NODE ANUNCIATOR MODULE | 1 | FCM-75-197009-001 |
| 20 | NODE PRM RELEASING MODULE | 4 | FCM-75-195002-001 |
| 21 | | | |

Application schedule of pipes/fittings and Cables / outback boxes /raceway conduits and fittings application schedule should be provided as per approved MAT

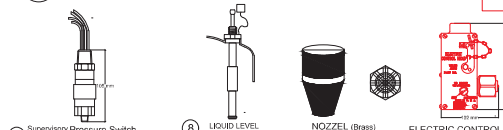


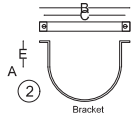

### PIPING LAYOUT VIEW
Scale 1:100




MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 3

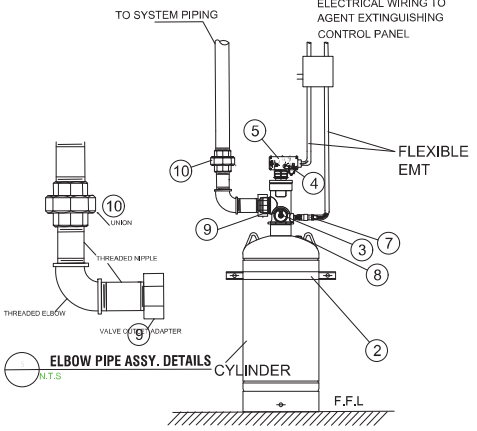
### GENERAL COMPONENTS DETAILS
N.T.S


⑦ Supervisory Pressure Switch P/N: 06-118262-001
⑧ LIQUID LEVEL INDICATOR LLI
NOZZEL (Brass)
ELECTRIC CONTROL HEAD ⑤ P/N. 890181




### MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS
N.T.S

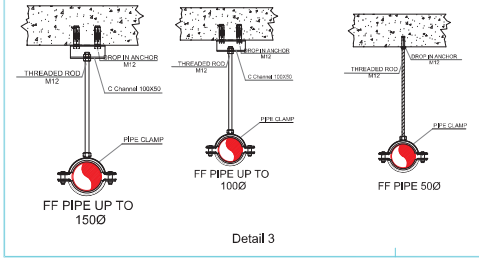
| VALVE OUTLET ADAPTORS | | | | | | |
|---|---|---|---|---|---|---|
| PART NO. | SIZE | A | B | C | D | WEIGHT |
| WK-353054-000 | 35mm | CC/35 (1-1/2") | 5.674 | 68mm | 57mm | 0.2 kg |
| WK-283053-000 | 51mm | CC/35 (2") | 2.900 | 78mm | 78mm | 0.3 kg |
| WK-353056-000 | 165mm (2.05") | CC/35 (1-1/2") | 3.45 | 78mm | 95mm | 0.2 kg |




### ELBOW PIPE ASSY. DETAILS
N.T.S

| MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS | |
|---|---|
| SN | DESCRIPTION |
| 1 | CYLINDER |
| 2 | BRACKET |
| 3 | CYLINDER VALVE |
| 4 | MANUAL LEVER |
| 5 | ELECTRIC CONTROL HEAD |
| 6 | PRESS. SWITCH |
| 7 | SUPERVISORY PRESS. SWITCH |
| 8 | LIQUID LEVEL INDICATOR |
| 9 | OUTLET VALVE ADAPTOR |
| 10 | UNION |
| 11 | MAINTENANCE SWITCH |
| 12 | JUNCTION BOX |
| 13 | FLEXIBLE EMT |

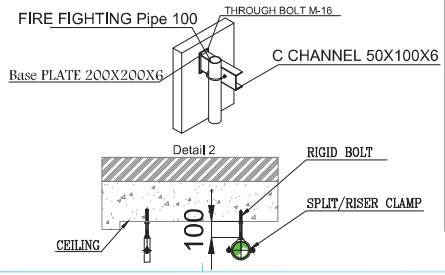
| PIPE SIZE mm (in) | M (ft) |
|---|---|
| 15 (1/2") | 2.4 (8ft) |
| 20 (3/4") | 2.7 (9ft) |
| 25 (1") | 2.7 (9ft) |
| 32 (1 1/4") | 2.7 (9ft) |
| 40 (1 1/2") | 3.7 (12ft) |
| 50 (2") | 4 (13ft) |
| 65 (2 1/2") | 4.3 (14ft) |
| 80 (3") | 4.6 (15ft) |
| 100 (4") | 5.2 (17ft) |



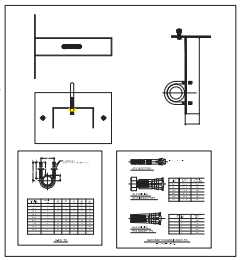

Detail 3

### Pipe Support Detalis
N.T.S

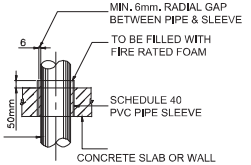
Detail 1 RIGID SUPPORT




Detail 1 RIGID SUPPORT



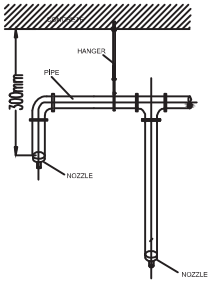
### ISOMETRIC VIEW
NTS


MIN. 6mm. RADIAL GAP BETWEEN PIPE & SLEEVE
6
TO BE FILLED WITH FIRE RATED FOAM
50mm
SCHEDULE 40 PVC PIPE SLEEVE
CONCRETE SLAB OR WALL

PIPE SLEEVE SCHEDULE:

| PIPE SIZE IN MM | SELLVE SIZE IN MM |
|---|---|
| 65 | 100 |
| 100 | 150 |

PIPE SLEEVE GENERAL




Client:
Ministry of Housing, Utilities & Urban Development
New Urban Communities Authority

Main Consultant:
Dar Al-Handasah (Egypt)

Sub-Consultant:
SHAKER

Contractor:

Project Name:

Dar Al-Handasah
Project No.: E19066-02005
CODE 1 APPROVED
CODE 2 APPROVED AS NOTED
CODE 3 RESUBMIT FOR APPROVAL
CODE 4 REJECTED
By: Khaled awad Date: 21-07-2022
Approval shall not relieve the Contractor of any of his obligations under the Contract, or constitute authorization of any change to Contract Documents or Variation to the Works. Contractor is responsible for dimensions, quantities and coordination with other trades.

NOTES / LEGEND:

| Legend | Symbol |
|---|---|
| FIRE FIGHTING AND ALARM/CONTROL PANEL Model AM8200 | F.F.C.P |
| ADDRESSABLE SMOKE DETECTOR Model SD-P3 | |
| ADDRESSABLE HEAT DETECTOR Model SD-HTF | |
| FIRE BELL Model MBA-6-24 | |
| STROBE WITH FLASHER Model SBR-A | SF |
| GAS ABORT Model Kidde 878762 | A |
| MANUAL RELEASE Kidde 3200 | M |
| FM200 CYLINDER | |
| Valve Outlet Adapter 2.5" P/N 90-020025-000 | |
| Cylinder Supervisory switch P/NO-118202-001 | |
| Electric control Head 24 VDC P/NO-890181-000 | |
| Electric control Head Monitor P/NO-100000-000 | |
| FM200 Nozzle | |
| NODE RELEASING MODULE NRM P/N 70-400008-001 | |
| NODE OUTPUT RELAY MODULE AO P/N 70-400004-001 | |
| NODE INPUT MONITOR MODULE AI P/N 70-417005-001 | AI |
| NODE OUTPUT ANIMAL MODULE AMM P/N 70-300320-000 | |

Revision Table:

| No. | Description | Date | Appr. |
|---|---|---|---|
| 00 | FOR APPROVAL | 14 MAY 2022 | ETHAN. |

Drawing Title:

CUC-E01 UTILITY BUILDING
FIRST FLOOR
MBD ROOM 1-133 PART 3
FM200 SUPPRESSION SYSTEM

| Designed | Checked | Approved |
|---|---|---|
| GHINY | GHINY | ETHAN |
| Drawn | Date | Scale |
| KARIO ALLAM | 11 MAY 2022 | 1:100 |

| SHD Type | CSCEC Contractor | 17 Package No. | E01 Building Type | ME Drawing Type | FF Sub Drawing Type | 04 Electro Mech Type | 01 Floor Level | 01 Part No. | 0001 Sheet No. | 0004 Sequence No. | 00 Revision No. |
|---|---|---|---|---|---|---|---|---|---|---|---|

## SEQUENCE OF OPERATION AS PER TOD

AUTOMATIC OPERATION

A) ACTUATION OF ANY ONE OF THE DETECTORS IN EITHER CIRCUIT WITHIN THE PROTECTED AREA SHALL:
1. ILLUMINATE ALARM INDICATOR ON THE CONTROL PANEL.
2. FM200CP energizes Alarm Bell inside protected areas.
3. Give visual indication on annunciator panel.
4. Transmit "ALARM" signal to Building Alarm system.
5. FM200CP transmits "ALARM" signal to FAS system.
6. FM200CP transmits signal to M/D actuators to close all MFDs related the protected related the protected room.
7. Release and close doors in protected area.

B) SUBSEQUENT OPERATION OF A CROSS-ZONED DETECTOR WITHIN THE PROTECTED AREA SHALL:
1. ILLUMINATE "PROJECTION" RELEASE" INDICATOR ON THE CONTROL PANEL.
2. FM200CP energize Horn/Strobe Device outside protected areas.
3. Give visual indication on annunciator panel.
4. ACTUATE CIRCUIT TO ENERGIZE 0-30 SECOND ADJUSTABLE EVACUATION TIMER.
5. ENABLE SYSTEM ABORT SEQUENCE.
6. ENG. FAN: within shut down via FAS (though MCC panel based on "ALARM" sent by FM200CP.
7. On Crib Auto Containment (For PA&PR rooms only): FM200CP transmits signal to Crib auto containment control box to open all fan windows.

C) AFTER PRE-SET TIME DELAY SEQUENCE, THE FOLLOWING SHALL OCCUR:
1. Solenoid (other FM200CP energizes solenoid valve to release FM200 into the protected area.
2. ILLUMINATE "RELEASE" INDICATOR ON THE CONTROL PANEL.
3. To FAS: FM200CP transmits "GAS RELEASED" signal to FAS system.

MANUAL OPERATION

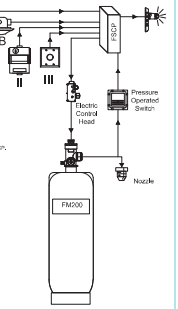
- Opening manual release stations will discharge extinguishing agent when activated SEQUENCE DESCRIBED ABOVE EXCEPT TIME DELAY AND ABORT FUNCTIONS. TIME DELAY CAN BE PROGRAMMED IF REQUIRED.

IN-ABORT OPERATION

1. IF ABORT SWITCH IS ACTIVATED WITHIN PRE-DISCHARGE PERIOD THE FOLLOWING SHALL OCCUR:
   - ILLUMINATE "ABORT" INDICATOR ON THE CONTROL PANEL.
   - RELEASE OF GAS WILL DELAY EXTINGUISHING AGENT DISCHARGE
   - IF ABORT SWITCH IS PRESSED CONTINUOUSLY, ALARM WILL RELEASE IF ABORT SWITCH IS RELEASED AND COUNTDOWN IS COMPLETED.

IN-LOW AGENT PRESSURE SWITCH

1. Initiate trouble alarm if sensing less than set pressure.
2. ILLUMINATE "SUP" INDICATOR ON THE CONTROL PANEL.

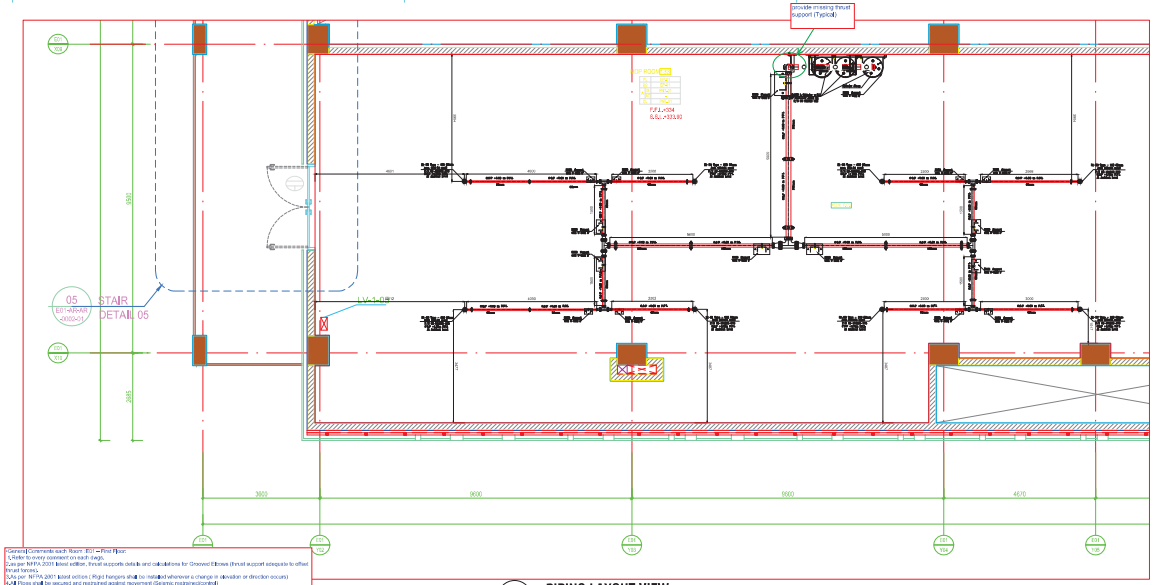



MDB 133 ROOM FM200/CYL.= 3x 300,00 KG PART 4

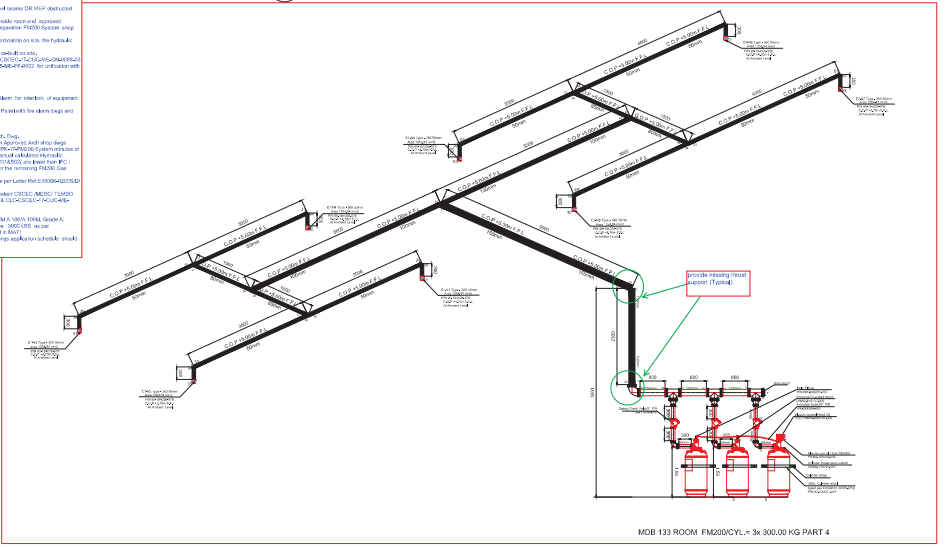
| nozzle | type | nozzle DIA | part number |
|---|---|---|---|
| E1-N1 | 360° | 50 mm | 90-194028-578 |
| E1-N2 | 360° | 50 mm | 90-194028-578 |
| E1-N3 | 360° | 50 mm | 90-194028-578 |
| E1-N4 | 360° | 50 mm | 90-194028-578 |
| E1-N5 | 360° | 50 mm | 90-194028-578 |
| E1-N6 | 360° | 50 mm | 90-194028-578 |
| E1-N7 | 360° | 50 mm | 90-194028-578 |
| E1-N8 | 360° | 50 mm | 90-194028-578 |

| NO. | | QTY | MODEL NO. |
|---|---|---|---|
| 1 | MAIN CYLINDER WITH CYLINDER VALVE & LLI | 1 PCS | 90-100091-101 |
| 2 | CYLINDER STRAP | 1 PCS | |
| 3 | ELECTRICAL CONTROL HEAD | 1 PCS | 90-890181-000 |
| 4 | SUPERVISORY PRESSURE SWITCH | 1 PCS | 90-119280-001 |
| 5 | FIRE SUPPRESSION CONTROL PANEL | 1 PCS | ARES 2.0 |
| 6 | MULTITONE HORN / STROBE | 1 PCS | SR-A |
| 7 | MANUAL PULL STATION | 1 PCS | 90-350000-001 |
| 8 | ABORT SWITCH | 1 PCS | 90-870762-010 |
| 9 | PHOTO SMOKE DETECTOR | 48 PCS | DS-4FS |
| 10 | HEAT DETECTOR | 48 PCS | DS-4HFS |
| 11 | ALARM BELL 6 " | 1 PCS | WB-A6-24 |
| 12 | PRESSURE OPERATED HEAD | 2 PCS | 90-870737-000 |
| 13 | Swing Check Valve 3" | 1 PCS | 90-116256-001 |
| 14 | Actuation hose 3 " | 2 PCS | WK-256000-003 |
| 15 | Male Elbow ⅜" Flare x 1/8" NPT | 2 PCS | WK-656005-000 |
| 16 | Male Connector ⅜" Flare x 1/8" NPT | 2 PCS | WK-656005-010 |
| 17 | KIDDE ASM MODULE | 3 PCS | 70-000204-003 |
| 18 | KIDDE AO RELAY MODULE | 0 PCS | 70-000004-001 |
| 19 | KIDDE AI MONITOR MODULE | 1 PCS | 71-417000-001 |
| 20 | KIDDE RELAY | 1 PCS | 70-000004-001 |

Application schedule of pipes/fittings and Cables / outback boxes /raceway conduits and fittings application schedule should be provided as per approved MAT

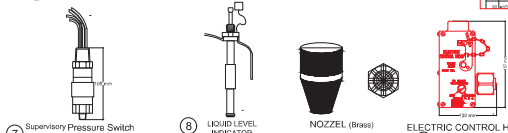


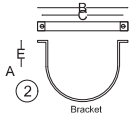

### PIPING LAYOUT VIEW
Scale 1:100




MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 4

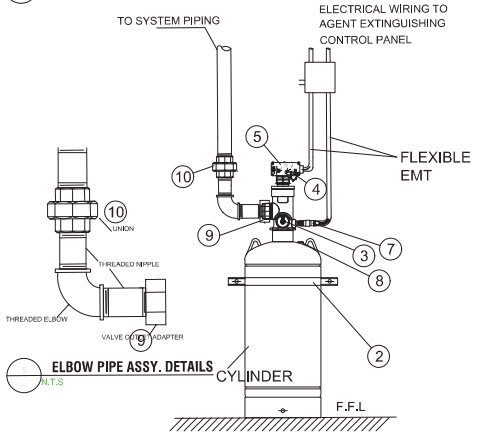
### GENERAL COMPONENTS DETAILS
N.T.S




| VALVE OUTLET ADAPTORS | | | | | | |
|---|---|---|---|---|---|---|
| PART NO. | SIZE | A | B | C | D | WEIGHT |
| WK-283004-000 | 38mm | DO-NFD (1-1/2") | 0.874 | 68mm | 83mm | 0.2 kg |
| WK-283005-000 | 51mm | DO-NFD (2") | 2.000 | 79mm | 79mm | 0.3 kg |
| WK-283006-000 | 65mm (2½") | DO-NFD (2-1/2") | 3.00 | 76mm | 95mm | 0.2 kg |

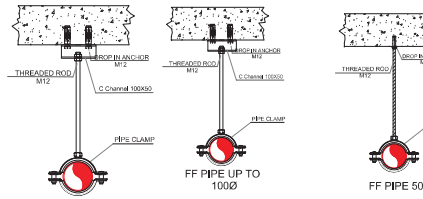
### MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS
N.T.S




| MAIN CYLINDER. GAS CYLINDER INSTALLATION DETAILS | |
|---|---|
| SN | DESCRIPTION |
| 1 | CYLINDER |
| 2 | BRACKET |
| 3 | CYLINDER VALVE |
| 4 | MANUAL LEVER |
| 5 | ELECTRIC CONTROL HEAD |
| 6 | PRESS. SWITCH |
| 7 | SUPERVISORY PRESS. SWITCH |
| 8 | LIQUID LEVEL INDICATOR |
| 9 | OUTLET VALVE ADAPTOR |
| 10 | UNION |
| 11 | MAINTENANCE SWITCH |
| 12 | JUNCTION BOX |
| 13 | FLEXIBLE EMT |

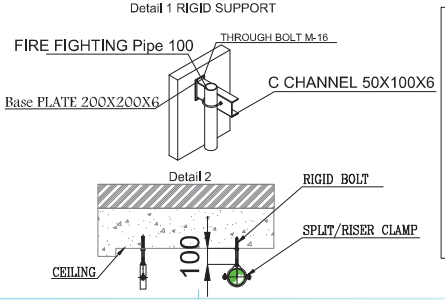
| PIPE SIZE HANGER SPACING | |
|---|---|
| mm (in) | M (ft) |
| 15 (1/2") | 2.4 (8ft) |
| 20 (3/4") | 2.7 (9ft) |
| 25 (1") | 2.7 (9ft) |
| 32 (1 1/4") | 2.7 (9ft) |
| 40 (1 1/2") | 3.7 (12ft) |
| 50 (2") | 4 (13ft) |
| 65 (2 1/2") | 4.3 (14ft) |
| 80 (3") | 4.6 (15ft) |
| 100 (4") | 5.2 (17ft) |

### ELBOW PIPE ASSY. DETAILS
N.T.S

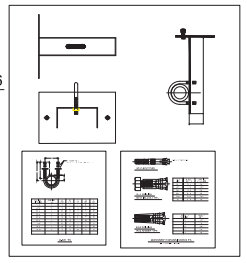



### Pipe Support Detalis
N.T.S

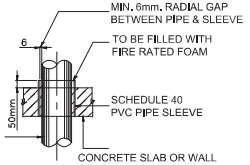
Detail 1 RIGID SUPPORT




Detail 1 RIGID SUPPORT



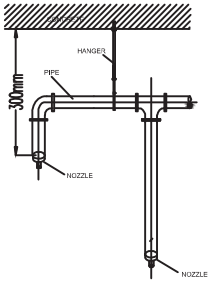
### ISOMETRIC VIEW
NTS


MIN. 6mm. RADIAL GAP BETWEEN PIPE & SLEEVE
TO BE FILLED WITH FIRE RATED FOAM
SCHEDULE 40 PVC PIPE SLEEVE
CONCRETE SLAB OR WALL
6
50mm

PIPE SLEEVE SCHEDULE:

| PIPE SIZE IN MM | SELLVE SIZE IN MM |
|---|---|
| 65 | 100 |
| 100 | 150 |

PIPE SLEEVE GENERAL




Client:
Ministry of Housing, Utilities & Urban Development
New Urban Communities Authority

Main Consultant:
dar Dar Al-Handasah (Egypt)

Sub-Consultant:
SHAKER CONSULTING GROUP

Contractor:

Project Name:
Central Business District

dar Dar Al-Handasah
Project No.: E18066-02005
☐ CODE 1 APPROVED
☑ CODE 2 APPROVED AS NOTED
☐ CODE 3 RESUBMIT FOR APPROVAL
☐ CODE 4 REJECTED
By: Khaled awad Date: 21-07-2022
Approval shall not relieve the Contractor of any of his obligations under the Contract or constitute authorization of any change to Contract Documents or Variation to the Works. Contractor is responsible for dimensions, quantities and coordination with other trades.

NOTES / LEGEND:

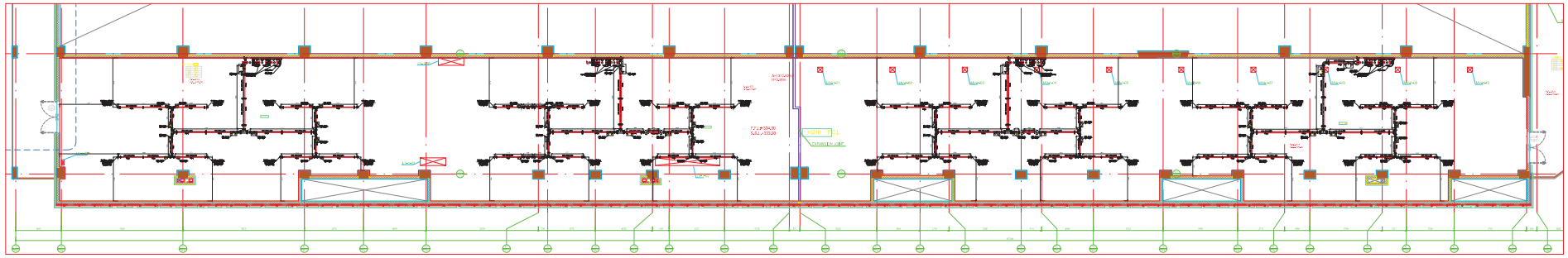
| Legend | Symbol |
|---|---|
| FIRE FIGHTING AND ALARM/CONTROL PANEL Model ARES | F.F.C.P |
| ADDRESSABLE SMOKE DETECTOR Model DF-FS | |
| ADDRESSABLE HEAT DETECTOR Model DF-HFS | |
| FIRE BELL Model MBA-6-24 | |
| STROBE WITH FLASHER Model HSR-A | SF |
| GAS ABORT Model Kidde 878762 | A |
| MANUAL RELEASE Kidde 3000 | M |
| FM200 CYLINDER | |
| Valve Outlet Adapter 2.5" P/N WK-283006-000 | |
| Cylinder Supervisory switch P/300-119280-001 | |
| Electric control Head 24 VDC P/890L-890181-000 | |
| Electric control Head Heater P/005-100000-000 | |
| FM200 Nozzle | |
| KIDDE RELEASING MODULE RRM P/N 70-000000-001 | |
| KIDDE OUTPUT RELAY MODULE AO P/N 70-000004-001 | |
| KIDDE INPUT MONITOR MODULE AI P/N 71-417000-001 | AI |
| KIDDE OUTPUT SIGNAL MODULE ASM P/N 70-000204-003 | |

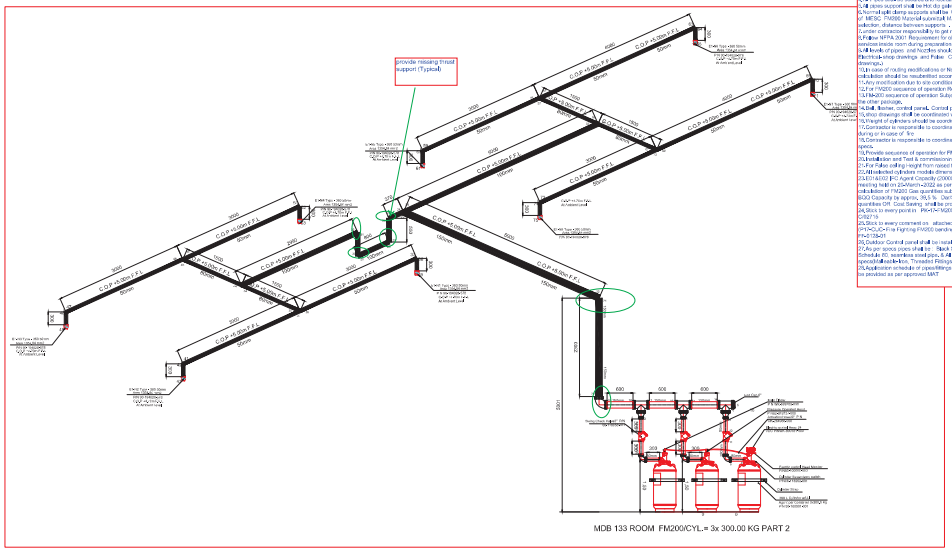
| Revision Table: | | | |
|---|---|---|---|
| No. | Description | Date | App. |
| 00 | FOR APPROVAL | 14 MAY 2022 | ETHAN |

Drawing Title:
CUC-E01 UTILITY BUILDING
FIRST FLOOR
MBD ROOM 1-133 PART 4
FM200 SUPPRESSION SYSTEM

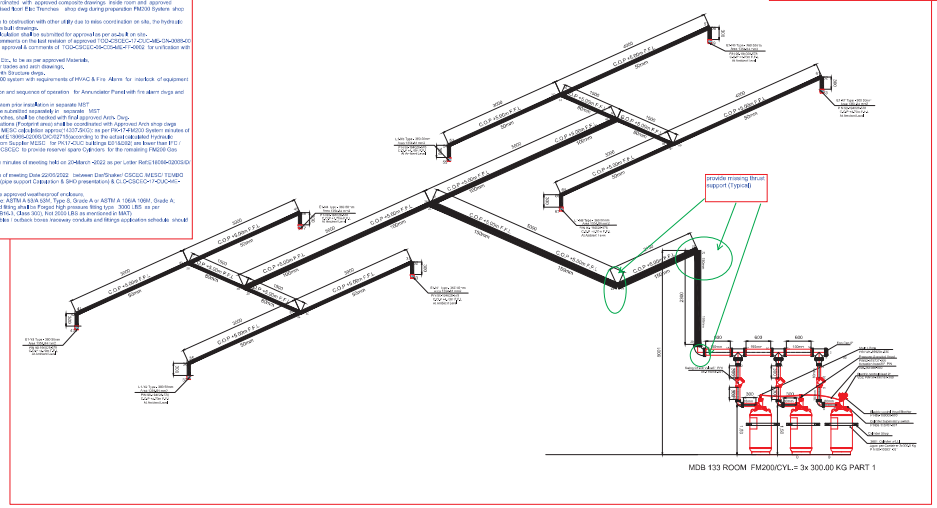
| Designed | Checked | Approved |
|---|---|---|
| GHANY | GHANY | ETHAN |
| Drawn | Date | Scale |
| KJADO ALAM | 11 MAY 2022 | 1:100 |

| SHD | CSCEC | 17 | E01 | ME | FF | 04 | 01 | 01 | 0001 | 00/5 | 00 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | Contractor | Previous No. | Building Type | Floors | Sub Group | Electric Type | Floor Level | Part No. | Sheet No. | Sequence No. | Rev. No. |

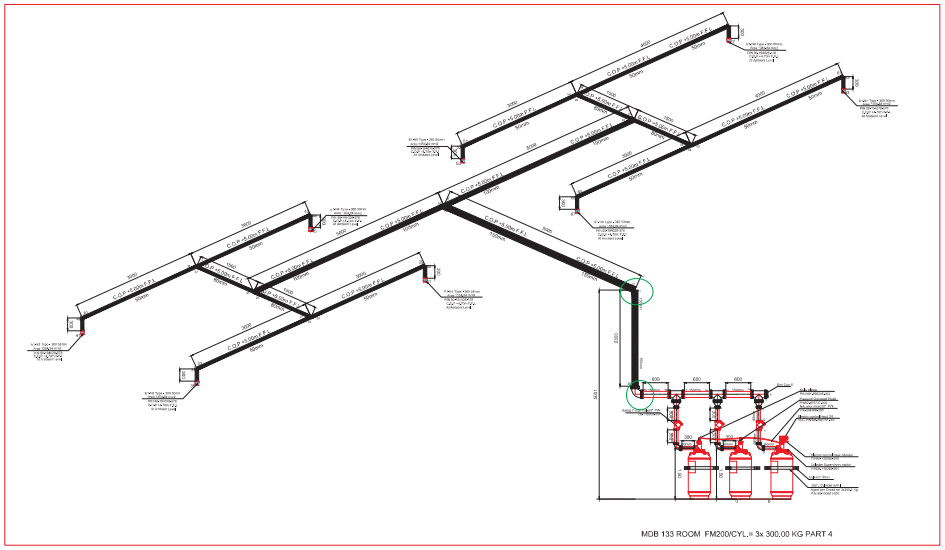




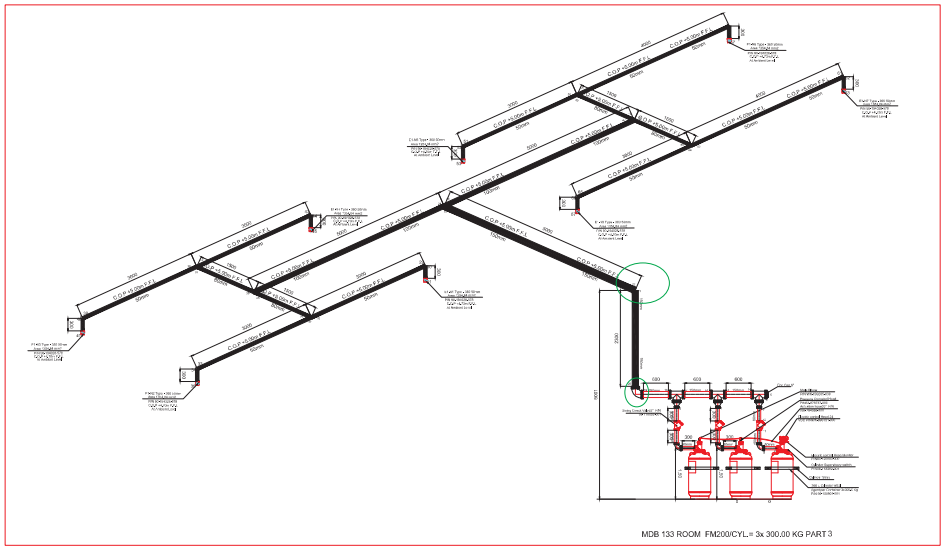

MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 2




MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 1



MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 4



MDB 133 ROOM FM200/CYL.= 3x 300.00 KG PART 3

General Comments each Room SAT ... FINDINGS:
1.Refer to every comment on each drgs..
2.as per NFPA 2001 latest edition, thrust supports details and calculations for Grooved Elbows (thrust support adequate to offset thrust forces)..
3.As per NFPA 2001 latest edition ( Rigid hangers shall be installed whenever a change in elevation or direction occurs)
4.All Pipes shall be secured and restrained against movement (Seismic restrained bracing)..
5.All clamp support shall be Hot dip galvanized (Typical)..
6.Normal split clamp supports shall be ULFM Firefighting black steel sch 80 pipe same as specified or of Material data sheet of MESC. FM200 Material submittal MAT-CSCEC-YUMEFP-01858-21 and confirmed with ANSI/MSS SP-58 for Materials, selection, distance between supports ..
7.Landlor contractor responsibility to get inquired conformation vis-thus any work start..
8.All Pipes shall be routed as coordinated with structural members (Penetration to avoid any steel beams OR MEP obstructed services inside room during preparation shop drawings, by/after contractor responsibility)..
9.All levels of pipes and Nozzles should be coordinated with approved composite drawings inside room and approved Electrical shop drawings and False Ceiling /raised floor/ Fiber Trenches shop drwg during preparation FM200 System shop drawings..
10.In case of routing modifications or Nozzle due to obstruction with other utility due to relax coordination on site, the hydraulic calculation should be resubmitted according to as built drawings..
11.Any modification due to site condition new calculation shall be submitted for approval as per as built on site..
12.For FM200 sequence of operation Refer to comments on the last revision of approved TCD-CSCEC-17-CUC-MES-DN-000540 .
13.The200 sequence of operation Subject to the approval & comments of TCD-CSCEC-04-CD-MES-T-14002 for co-ordination with the other package..
14.Control panel, Zoned panel, Control panel ... Etc, to be as per approved Materials..
15.shop drawings shall be coordinated with other trades and vent drawings..
16.Height of cylinders should be coordinated with Structure dwgs..
17.Contractor is responsible to coordinate FM200 system with requirements of HVAC & Fire Alarm for interlock of equipment during or in case of fire..
18.Contractor is responsible to coordinate location and sequence of operation for Annunciator Panel with fire alarm dwgs and specs..
19.Provide sequence of operation for FM200 system prior installation in separate MST
20.Installation and Test & commissioning shall be submitted separately in separate MST
21.For False ceiling height from raised floor/Trenches, shall be checked with final approved Arch. Dwg..
22.All detected cylinders models dimensions, locations (Footprint area) shall be coordinated with Approved Arch shop dwgs
23.ATEX and IEC Hybrid Equipment (2006/95/EC) (94/9/EC) (ATEX) Directive (2004/108/EC) Electromagnetic Compatibility Directive
24.Submittal for FM-200 Gaseous Fire Suppression System shall be submitted to the Engineer for approval before any work commences. Submittal shall include, but not be limited to, the following: Manufacturer's literature and data for all components including the following: Hydraulic calculations Design drawings Qualified Installer List Valve, Device, Detector, and Control Panel Data Sheets Material Safety Data Sheets (MSDS) Capacity tag signals, PA/S %. Dan/Shaker - CSCEC to provide reserved spare Cylinders for the remaining FM200 Gas quantities Off. Cool Saving, shall be proved)..
25.Refer to every point in RFI-CN-14000 System minutes of meeting held on 2-04dec-r-2022 as per Letter Ref:S16084-2203/SD-C00219 .
26.Refer to every comment on attached minutes of meeting Date:22/05/2022 between Dar/Shaker/ CSCEC MESC/ TCMBO P1+C+L-F1a Fighting FM200 bending issues (pipe support Colapsion & SHD presentations) & CL-CSCEC-17-CUC-ME-Plot:13x01
27.Outdoor Control panel shall be installed inside approved weatherproof enclosure..
28.All pipe specs used shall be Black Steel Pipes ASTM A-53A GR. Type S, Grade A or ASTM A 106A /106M, Grade A, seamless carbon steel pipe, Schedule 40 unless noted otherwise, & All threaded fitting shall be Forged high pressure fitting type, 3000 LBS as per specified Standard Reference: Standard Pipe, ASME B36.1, (Spec 900), And ASTM B5 as mentioned in MAT..
29.Application schedule of pipes/fittings and Cables / outback boxes raceway conduits and fittings application schedule should be provided as per approved MAT

Application schedule of pipes/fittings and Cables / outback boxes /raceway conduits and fittings application schedule should be provided as per approved MAT

Client:
Ministry of Housing, Utilities & Urban Development
New Urban Communities Authority

Main Consultant:
dar Dar Al-Handasah (Egypt)

Sub-Consultant:
SHAKER

Contractor:
中国建筑第六工程局有限公司 CHINA STATE CONSTRUCTION NO.6 ENGG.LTD

Project Name:
**Central Business District Of the New Administrative Capital**
CBD EAST - PHASE 1

dar Dar Al-Handasah
Project No.: E19066-0200S
☐ CODE 1 APPROVED
☑ CODE 2 APPROVED AS NOTED
Work may proceed before resumption of endorsed comments
☐ CODE 3 RESUBMIT FOR APPROVAL
Work may not proceed
☐ CODE 4 REJECTED
By: Khaled awad Date: 21-07-2022
Approval shall not relieve the Contractor of any of his obligations under the Contract or constitute authorization of any change to Contract Documents or Variation to the Works. Contractor is responsible for dimensions, quantities and coordination with other trades.

| | |
|---|---|
| FIRE FIGHTING AND ALARM CONTROL PANEL Model AM8R | F.F.C.P |
| ADDRESSABLE SMOKE DETECTOR Model SP-P8 | S |
| ADDRESSABLE HEAT DETECTOR Model SP-HP8 | D |
| FIRE BELL Model MBA-6-24 | |
| STROBE WITH FLASHER Model MSR-A | SF |
| GAS ABORT Model Kidde 878762 | A |
| MANUAL RELEASE Kidde 2000 | M |
| FM200 CYLINDER | |
| Valve Outlet Adapter 2.5" P/N HC-4000E-000 | |
| Cylinder Supervisory switch P/N06-11S000-001 | |
| Electric control Head 24 VDC P/N0E-0001E-000 | |
| Electric control Head Monitor P/N05-10000-000 | |
| FM200 Nozzle | |
| KIDDE RELEASING MODULE RRM P/N 70-000000-001 | |
| KIDDE OUTPUT RELAY MODULE AO P/N 70-400004-001 | |
| KIDDE INPUT MONITOR MODULE AI P/N 70-870005-001 | AI |
| KIDDE OUTPUT SIGNAL MODULE ASM P/N 70-300320-000 | |

Revision Table:

| No. | Description | Date | App. |
|---|---|---|---|
| 00 | FOR APPROVAL | 14 MAY 2022 | ETHAN. |

Drawing Title:
CUC-E01 UTILITY BUILDING
FIRST FLOOR
MBD ROOM 1-133 LAYOUT
FM200 SUPPRESSION SYSTEM

| Designed | Checked | Approved |
|---|---|---|
| GHANY | GHANY | ETHAN |
| Drawn | Date | Scale |
| KARIO ALLAM | 11 MAY 2022 | 1:100 |

| Type | Contractor | Package No. | Building Type | Area | Sub Discip. | Floor Type | Floor Level | Part No. | Sheet No. | Sequence No. | Rev. No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SHD | CSCEC | 17 | E01 | ME | FF | 04 | 01 | 01 | 0001 | 0006 | 00 |

QUANTITY SURVEY OF INSTALLED PIPES

| | | QTY.(M) | NOTES |
|---|---|---|---|
| 1 | PIPES Ø50mm | 95.66 | |
| 2 | PIPES Ø80mm | 34.8 | |
| 3 | PIPES Ø100mm | 40.232 | |
| 4 | PIPES Ø150mm | 37.35 | |
| 5 | | | |
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SITE ENGINEER (CSCEC)

QC ENGINEER

Abdelghany Fouad

مسك للاستشارات والخدمات البكانيكية

**11.5 Checklist**

| CUC Project –P17 | NUCA | dar | |
|---|---|---|---|

## INSPECTION CHECK LIST
FOR INSTALLATION OF FM-200 SYSTEM

| SPEC: | REF. DWG NO: | INSPECTION REQUEST NO: |
|---|---|---|

REF NO:

| Sr. No | ITEM DESCRIPTION: | VERIFIED | | |
|---|---|---|---|---|
| | | Accepted | Rejected | |
| | **1-Mechanical installations:** | | | |
| 1 | Check system models, types, sizes and capacities as per approved submittal/calculation/shop drawings. | ☐ | ☐ | |
| 2 | Piping installed as per approved shop drawings include normal supports, rigid supports, thrust supports, NFPA manufacturer recommendation, clean and no physical damage. | ☐ | ☐ | |
| 3 | Agent cylinders is charged, installed as per approved shop drawings, NFPA manufacturer recommendation, clean and no physical damage. | ☐ | ☐ | |
| 4 | After installation acceptance piping is ready to second stage of pneumatic test | ☐ | ☐ | |
| 5 | Puff test after install nozzles | ☐ | ☐ | |
| 6 | Check the seismic bracing if exiting | ☐ | ☐ | |
| 7 | Room integrity test done and accepted. | ☐ | ☐ | |
| 8 | Check pipe identifications and labels | ☐ | ☐ | |
| | **2-Detection system installations:** | | | |
| 1 | Conduits, fire alarm cables are installed as per approved shop drawings and approved (LC SPECS/MST/ITP) | ☐ | ☐ | |
| 2 | Activation devices installed as per approved shop drawings, NFPA manufacturer recommendation, clean and no physical damage and approved (LC SPECS/MST/ITP) | ☐ | ☐ | |
| 3 | Control panel and notification devices installed as per approved shop drawings, NFPA manufacturer recommendation, clean and no physical damage and approved (LC SPECS/MST/ITP) | ☐ | ☐ | |
| 4 | Fire suppression control panel is installed as per approved Material/ approved shop drawings, NFPA manufacturer recommendation, clean and no physical damage | ☐ | ☐ | |

☐ if item verified put "√" mark

| | PREPARED BY | VERIFIED BY | APPROVED BY |
|---|---|---|---|
| | CSCEC | CSCEC | SHAKER (SCG) |
| Name | | Abdelghany Tantawy | |
| Position | Site Engr | QC Engineer | |
| Date | | | |
| Signature | Liang Weilin | | |

mesc مسك للإستشارات والخدمات الميكانيكية